



# HPE NFV Director

On-Boarding Guide Operations:    Deploy of a Virtual Link  
Release 4.1  
Second Edition

# Notices

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# Preface

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## About this guide

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This Guide is intended to explain and guide the user through the deployment of a Tenant

## Audience

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This document is targeting any user level of NFV Director: Domain users, Organization Users, Tenant Users, Group Users and Datacenter users.

For On boarding VNFs please refer to VNF On-Boarding Guide

## Document history

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Table 1: Document history

<b>Edition</b>	<b>Date</b>	<b>Description</b>
1.0	30 August 2016	First Edition

# Chapter 1 Deploy of a Virtual Link.

From now on, and to make easier the understanding of the TLDs, we are going to explain the functionality of each set of TASK\_LIST\_DEFINITION:GENERIC, and the number of TASK\_DEFINITION:GENERIC children of the previously mentioned TASK\_LIST\_DEFINITION:GENERIC.

Basically, the TASK\_LIST\_DEFINITION:GENERIC connect what we can consider “units of execution”, those are the TASK\_DEFINITION:GENERIC, that have a WORKFLOW assigned to be executed when the execution of the TLD reach them.

If you like to have a more deep knowledge about the workflows mentioned through this document please refer to the specific document.



If in the category FIND, the attribute Path is present, the attribute FIND.ArtifactType will be the starting artifact for the Path, but the FIND.Status attribute refers to the last artifact on the Path.

**FIND.ArtifactType ==** **VIRTUAL\_MACHINE.**  
**FIND.Status==** **INSTANTIATED.**  
**FIND.Path==**

**VIRTUAL\_MACHINE>VIRTUAL\_CORE<CORE<CPU<SERVER<AVAILABILITY\_ZONE<REGION**  
**>COMPUTE>FLAVOR**

**In this example, we are looking for a FLAVOR in status INSTANTIATED, we do not expect to get a VIRTUAL\_MACHINE, in status INSTANTIATED.**



If during the use of the TLDs, the “Regenerate UUIDs” option is used, the user should check the Id of the tree that brings all the elements of the TLD, this “id” is specific and it will be the same for all the tree groups in all the TLDs.



The two modes available are “Default” and “Simulated”, the second one is only available if it is configured previously, by defect, and the mode that will be used is “Default”.

## Chapter 2 Specific Elements of the TLD Deploy Virtual Link.

In this chapter the different elements of the specific TLD will be explained conscientiously.

### 2.1 TLD QUOTA ASSIGNMENT: Quota Assignment Task.

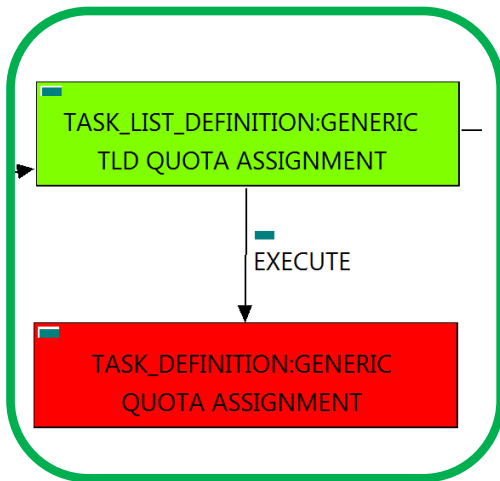


Figure 1: Quota Assignment task.

The TDs that have present in the their names “Assignment”, are Task Definitions responsible of the assignation of resources for an specific artifact, in the case of the quotas, the TLD it is going to assign an amount of each resource needed for the correct execution of the deployment.

Once finished, our VNF should have every quota needed for a successful deployment assigned, having taken in consideration all the rules for the assignment. This is crucial, because our component consume quotas during the execution of the TLD.

Targets of the TASK DEFINITION:  
ENABLED

STATUS of the TD:

```

GENERAL.Name ==                               Quota_Assignment
FIND.MainArtifact ==      VIRTUAL_LINK:PHYSICAL
EXECUTE.Workflow ==
    "WF_NFVD_ASSIGNMENT_QUOTA"
EXECUTE.Inactive==                               false
ROLLBACK.Behaviour_on_error ==      ROLLBACK
ROLLBACK.Number_of_retries ==      0
DATA.Lock ==                               false
INPUT_MAPPING.MAPPING_LIST ==
assignmentRelationshipID=Quota_Assignment;
resourceTreeID=nfvd#quotaResourceID;
cacheLevel=full
  
```

The Workflow present in EXECUTE.Workflow it is going to seek the artifact identified by the Id given, this id should belong to an artifact VIRTUAL\_LINK:PHYSICAL in Status INSTANTIATED in the DDBB, when the WF find it, it will start. This workflow will assign all the resources needed by the VIRTUAL\_LINK:PHYSICAL to get a successful Deploy, it will check the available resources and decide which one should be assigned.

The Workflow also check the affinity policies , in case our TLD has it, the way the assignation it is going to behave depends also of this policies, once checked, we launch the assignation of resources.

The assignation of resources it uses another WF that it is called from our workflow, “WF\_NFVD\_ASSIGN\_RESOURCES”.

In case of error during the execution, the workflow jump to the ROLLBACK category, if the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, the attribute “number\_of\_retries” set the number of rollback attempts. In this case, the TLD has not assigned a rollback workflow, so in this case the TD will only change the status of the artifact which is being used.

Due to that the value of the attribute DATA.Lock is false, when the Task Definition has finished the artifact that was used in the workflow executed will remain unlocked.



## 2.2 TLD DEPLOY\_VIRTUAL\_LINK: CREATE\_NETWORK.

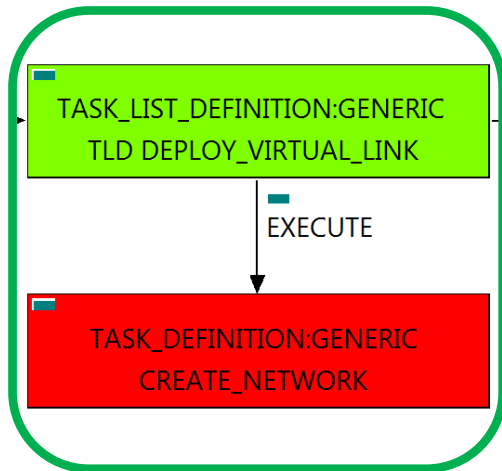


Figure 2: Creation of a network.

The TDs that have present in their names “Create”, are Task Definitions responsible of the provision of a specific artifact, in this case, NETWORKS of two types, DCN and OPENSTACK, the TLD it is going to query ORGANIZATION, END\_POINTS, TENANTS and other entities needed, until the TD finish with the harvest of all the attributes needed for the creation, and after, for the correct behavior of the component during the activation.

Once finished, our TD should have provisioned every NETWORK needed for a successful deployment assigned, on DCN and OPENSTACK platform, these artifacts must be properly related to the VIRTUAL\_LINK given.

Targets of the TASK DEFINITION:  
ENABLED

STATUS of the TD:

```

GENERAL.Name ==                CREATE_NETWORK
SET.Running_Status ==          INSTANTIATED.
SET.Status ==                   INSTANTIATED.
EXECUTE.Workflow ==
    "WF_TS_PROVISION_NETWORK"
EXECUTE.Inactive ==              false
ROLLBACK.Behaviour_on_error ==  ROLLBACK
ROLLBACK.Number_of_retries ==   0
ROLLBACK.Workflow ==
    "WF_TS_PROVISION_NETWORK_UNDO"
DATA.Lock ==                     true
  
```

The Workflow present in EXECUTE.Workflow it is going to provision a NETWORK:GENERIC in a Status INSTANTIATED in the DDBB. This workflow assign all the resources needed by the Virtual Link to get a successful Deploy, it will check the available resources and decide which one should be assigned.

The creation Networks it uses two other WFs that it are called from our workflow depending the needs of the provision, these workflows are “WF\_TS\_PROVISION\_NETWORK\_SDN” and “WF\_TS\_PROVISION\_NETWORK\_OPENSTACK”.

In case of error during the execution, the workflow jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, the attribute “number\_of\_retries” set the number of rollback attempts. In this case, the TLD has assigned the rollback workflow “WF\_TS\_PROVISION\_NETWORK\_UNDO”. For this TD the behavior set is “STOP”, if an error take place in this TD, no action will be taken, the execution of the TLD will continue.

Due to that the value of the attribute DATA.Lock is true, once the TD has finished, the artifact Network recently provisioned, will be blocked.





2.5 TLD ACTIVATE OPENSTACK NET:  
ACTIVATE\_NETWORK\_OPENSTACK

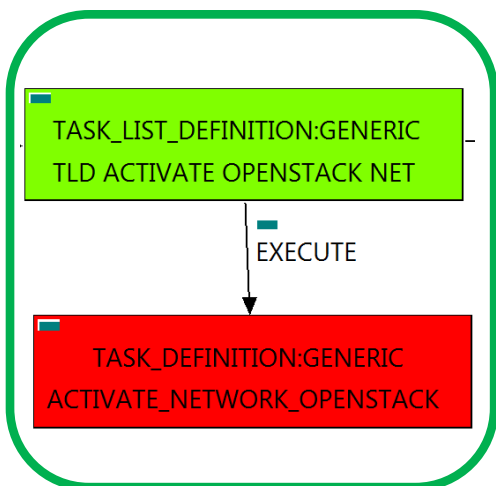


Figure 5: Activation of a Network in the Openstack platform.

The TDs that have present in the their names “Activate”, are Task Definitions responsible of the activation in the platform targeted and the updating of the status in the platform and the DDBB, in this case, the artifact that is going to be activated is a “NETWORK:OPENSTACK”, this means, when this workflow finish, we will have a NETWORK:OPENSTACK with status ACTIVE identified as part of the Service Network.

Targets of the TASK DEFINITION: STATUS of the TD:  
ENABLED

```

GENERAL.Name ==ACTIVATE_NETWORK _OPENSTACK
FIND.MainArtifact ==
VIRTUAL_LINK>NETWORK:GENERIC>
NETWORK:OPENSTACK@status=INSTANTIATED
SET.Running_Status == INSTANTIATED.
Set.Status == ACTIVE.
EXECUTE.Workflow ==
“WF_TS_ACTIVATE_NETWORK”
EXECUTE.Inactive== false
ROLLBACK.Behaviour_on_error == STOP
ROLLBACK.Number_of_retries == 0
ROLLBACK.Workflow ==
“WF_TS_DEACTIVATE_NETWORK”
DATA.Lock == true
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a “NETWORK:OPENSTACK” in Status INSTANTIATED in the DDBB . Notice that we are not trying to get a VIRTUAL\_LINK in status INSTANTIATED. The query it is going to use the Path present in the category FIND.MainArtifact. Once found , the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

The TD also create all the relationship needed for the correct behavior of the recently created artifact.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, this is “WF\_TS\_DEACTIVATE\_NETWORK”, but in this case, we have a “STOP” set as behavior, so no Rollback it is going to be initiated, so the execution it is going to end here in case of error.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as “Locked”.



2.7 TLD INVENTORY DCN POLICIES: CREATE\_INGRESS\_ENTRY\_ANY.

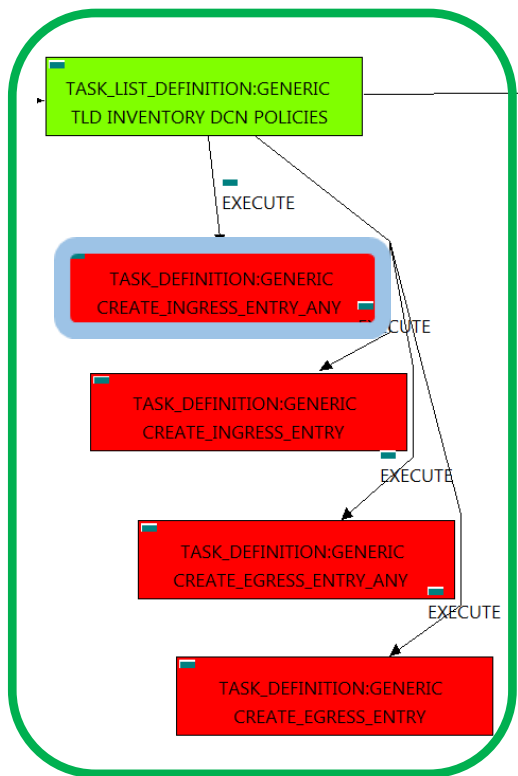


Figure 7: Creation of the Ingress Entry Policies of type net to Any.

This TD it is going to provision a INGRESSACLENTY:TEMPLATE:DCN “ANY” for each NETWORK or SUBNETWORK on each VIRTUAL\_LINK that we have in our DC, this means, the WF implied in this TLD is going to query from END\_POINT:FW to the VIRTUAL\_LINK trying to reach the NETWORKS on the VL component. Once the TD has the list it is going to validate some attributes present in those Networks or Subnetworks in order to create the policy INGRESSACLENTY:TEMPLATE:DCN related to policy INGRESSACL:TEMPLATE:DCN with a relationship of type DEFINE and status ENABLED.

These policies allow the traffic in both direction from the element that owns the policy to the rest of the elements reachable underneath the ORGANIZATION artifact.

Once finished, we will have provisioned an INGRESSACLENTY:TEMPLATE:DCN artifact with status INSTANTIATED for each NETWORK or SUBNETWORK(depends on the validation of the cited attributes) with all the relationship needed for the correct behavior of the artifact, prepared to be activated when required, which is a relationship of type DEFINE between each policy created and the INGRESSACL:TEMPLATE:DCN that is unique and it is acting as parent in the relationship.

Targets of the TASK DEFINITION:  
ENABLED

STATUS of the TD:

```

GENERAL.Name ==                                CREATE_INGRESS_ENTRY
FIND.MainArtifact==          VIRTUAL_LINK>NETWORK#SDN.Access_level=ANY
SET.Running_Status ==          INSTANTIATED.
Set.Status ==                  INSTANTIATED.
EXECUTE.Workflow ==
“WF_TS_PROVISION_SDN_ZONE_ANY_INGRESSACL_ENTRY”
EXECUTE.Inactive==            false
ROLLBACK.Behaviour_on_error ==          ROLLBACK
ROLLBACK.Number_of_retries ==          0
DATA.Lock ==                    true
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a “VIRTUAL\_LINK” in Running Status INSTANTIATED in the DDBB, that matches the condition present in the attribute FIND.MainArtifact:” SDN.Access\_level==constant:ANY”. Once found, the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, but in this case, the TD has not a rollback workflow set, so no Rollback it is going to be initiated, the execution will continue without noticing.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as “Locked”.

2.8 TLD INVENTORY DCN POLICIES: CREATE\_INGRESS\_ENTRY.

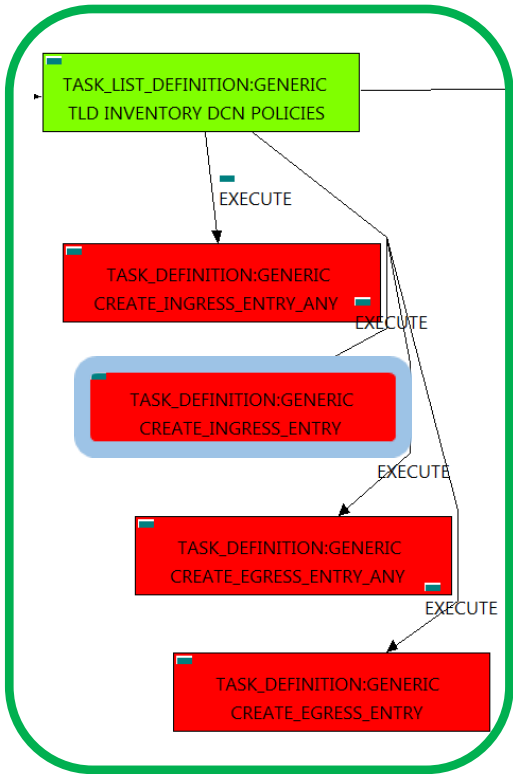


Figure 8: Creation of the Ingress Entry Policies.

This TD it is going to provision a INGRESSACLENTY:TEMPLATE:DCN for each NETWORK or SUBNETWORK on each VIRTUAL\_LINK that we have in our DC, this means, the WF implied in this TLD is going to query from END\_POINT:FW to the VIRTUAL\_LINK trying to reach the NETWORKS on the VL component. Once the TD has the list it is going to validate some attributes present in those Networks or Subnetworks in order to create the policy INGRESSACLENTY:TEMPLATE:DCN related to policy INGRESSACL:TEMPLATE:DCN with a relationship of type DEFINE and status ENABLED.

Once finished, we will have provisioned an INGRESSACLENTY:TEMPLATE:DCN artifact with status INSTANTIATED for each NETWORK or SUBNETWORK(depends on the validation of the cited attributes) with all the relationship needed for the correct behavior of the artifact, prepared to be activated when required, which is a relationship of type DEFINE between each policy created and the INGRESSACL:TEMPLATE:DCN that is unique and it is acting as parent in the relationship.

Targets of the TASK DEFINITION:  
ENABLED

STATUS of the TD:

```

GENERAL.Name ==                                CREATE_INGRESS_ENTRY
SET.Running_Status ==                          INSTANTIATED.
Set.Status ==                                  INSTANTIATED.
EXECUTE.Workflow ==                            "WF_TS_PROVISION_SDN_INGRESSACLENTRIES_POLICIES"
EXECUTE.Inactive==                             false
ROLLBACK.Behaviour_on_error ==                 ROLLBACK
ROLLBACK.Number_of_retries ==                  0
ROLLBACK.Workflow ==                          "WF_TS_PROVISION_SDN_INGRESSACLENTRIES_POLICIES_UNDO"
DATA.Lock ==                                   true
INPUT_MAPPING.MAPPING_LIST==
assignmentRelationshipID=Resource_Assignment;
resourceTreeID=resourceArtifactID
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a "VIRTUAL\_LINK in Running Status INSTANTIATED in the DDBB . Once found, the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the "Behaviour\_on\_error" attribute its set on "ROLLBACK" the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, this is "WF\_TS\_PROVISION\_SDN\_EGRESSACL\_POLICIES\_UNDO", if the TD cannot find the workflow specified, the execution will throw an error and finish.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as "Locked".

2.9 TLD INVENTORY DCN POLICIES: CREATE\_EGRESS\_ENTRY\_ANY.

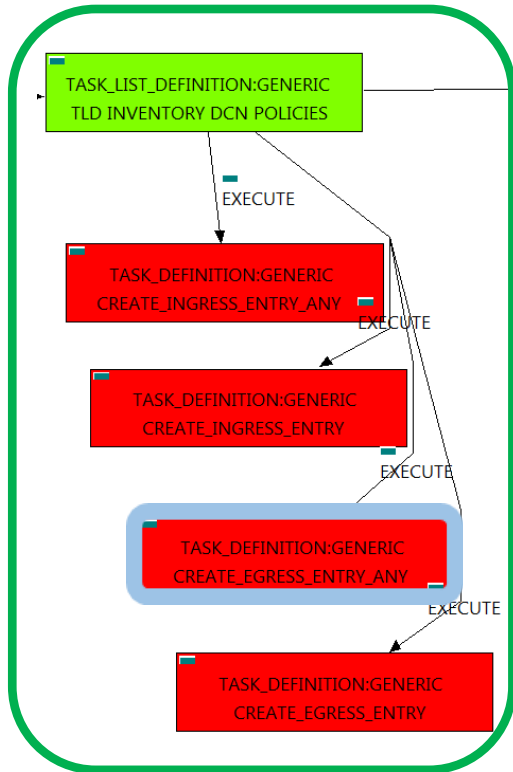


Figure 9: Creation of the Egress Entry Policies, to ANY.

This TD it is going to provision a EGRESSACLENTY:TEMPLATE:DCN “ANY” for each NETWORK or SUBNETWORK on each VIRTUAL\_LINK that we have in our DC, this means, the WF implied in this TLD is going to query from END\_POINT:FW to the VIRTUAL\_LINK trying to reach the NETWORKS on the VL component. Once the TD has the list it is going to validate some attributes present in those Networks or Subnetworks in order to create the policy EGRESSACLENTY:TEMPLATE:DCN related to policy EGRESSACL:TEMPLATE:DCN with a relationship of type DEFINE and status ENABLED.

These policies allow the traffic in both direction from the element that owns the policy to the rest of the elements reachable underneath the ORGANIZATION artifact.

Once finished, we will have provisioned an EGRESSACLENTY:TEMPLATE:DCN artifact with status INSTANTIATED for each NETWORK or SUBNETWORK(depends on the validation of the cited attributes) with all the relationship needed for the correct behavior of the artifact, prepared to be activated when required, which is a relationship of type DEFINE between each policy created and the EGRESSACL:TEMPLATE:DCN that is unique and it is acting as parent in the relationship.

Targets of the TASK DEFINITION:  
ENABLED

STATUS of the TD:

```

GENERAL.Name ==                CREATE_EGRESS_ENTRY
FIND.MainArtifact==            VIRTUAL_LINK>NETWORK#SDN.Access_level=ANY
SET.Running_Status ==          INSTANTIATED.
Set.Status ==                  INSTANTIATED.
EXECUTE.Workflow ==            “WF_TS_PROVISION_SDN_ZONE_ANY_EGRESSACL_ENTRY”
EXECUTE.Inactive==             false
ROLLBACK.Behaviour_on_error == ROLLBACK
ROLLBACK.Number_of_retries == 0
DATA.Lock ==                   true
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a “VIRTUAL\_LINK” in Running Status INSTANTIATED in the DDBB, that matches the condition present in the attribute FIND.MainArtifact:” SDN.Access\_level==constant:ANY”. Once found, the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, this is “WF\_TS\_PROVISION\_SDN\_ZONE\_ANY\_EGRESSACL\_ENTRY”.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as “Locked”.



2.10 TLD INVENTORY DCN POLICIES: CREATE\_INGRESS\_ENTRY.

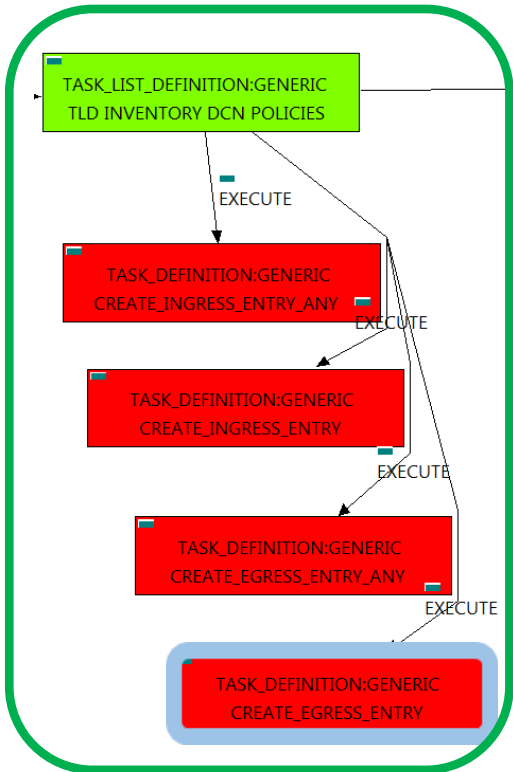


Figure 10: Creation of the Egress Entry Policies.

This TD is going to provision a EGRESSACLENTY:TEMPLATE:DCN for each NETWORK or SUBNETWROK on each VIRTUAL\_LINK that we have in our DC, this means, the WF implied in this TLD is going to query from END\_POINT:FW to the VIRTUAL\_LINK trying to reach the NETWORKS on the VL component. Once the TD has the list it is going to validate some attributes present in those Networks or Subnetworks in order to create the policy EGRESSACLENTY:TEMPLATE:DCN related to policy EGRESSACL:TEMPLATE:DCN with a relationship of type DEFINE and status ENABLED.

Once finished, we will have provisioned an EGRESSACLENTY:TEMPLATE:DCN artifact with status INSTANTIATED for each NETWORK or SUBNETWORK(depends on the validation of the cited attributes) with all the relationship needed for the correct behavior of the artifact, prepared to be activated when required, which is a relationship of type DEFINE between each policy created and the EGRESSACL:TEMPLATE:DCN that is unique and it is acting as parent in the relationship.

Targets of the TASK DEFINITION:  
ENABLED

STATUS of the TD:

```

GENERAL.Name ==                                CREATE_EGRESS_ENTRY
SET.Running_Status ==                          INSTANTIATED.
Set.Status ==                                  INSTANTIATED.
EXECUTE.Workflow ==
    "WF_TS_PROVISION_SDN_EGRESSACLENTRIES_POLICIES
EXECUTE.Inactive==                             false
ROLLBACK.Behaviour_on_error ==                 ROLLBACK
ROLLBACK.Number_of_retries ==                  0
ROLLBACK.Workflow ==
    "WF_TS_PROVISION_SDN_EGRESSACLENTRIES_POLICIES_UNDO"
DATA.Lock ==                                    true
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a "VIRTUAL\_LINK in Running Status INSTANTIATED in the DDBB . Once found, the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the "Behaviour\_on\_error" attribute its set on "ROLLBACK" the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, this is "WF\_TS\_PROVISION\_SDN\_EGRESSACL\_POLICIES\_UNDO", but in this case, we have a "STOP" as value set for behavior, so no Rollback it is going to be initiated, the execution will continue without noticing.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as "Locked".

2.11 TLD ACTIVATE DCN POLICIES: ACTIVATE\_INGRESS\_ENTRY

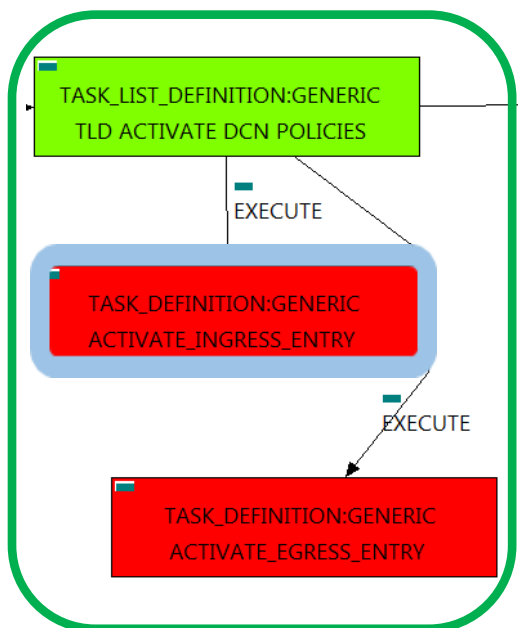


Figure 11: Activation of the Ingress Entry Policies for Virtual Link.

The TDs that have present in the their names “Activate”, are Task Definitions responsible of the activation in the platform targeted and the updating of the status in the platform and the DDBB, in this case, the artifact that is going to be activated is a “INGRESSACLENTY”, this means, when this workflow finish, we will have a INGRESSACLENTY with status ACTIVE associated to the INGRESSACL policy, and finally related to the VIRTUAL\_LINK that it is going to be used it in the activation.

Targets of the TASK DEFINITION: STATUS of the TD:  
 ENABLED

```

GENERAL.Name ==                ACTIVATE_INGRESS_ENTRY
FIND.MainArtifact==            VIRTUAL_LINK>NETWORK:GENERIC
FIND.Condition ==
GENERAL.Name==INGRESSACL_%GENERAL.Name%_PolicyBase&
ACLENTY.LocationType==constant:ZONE&&
ACLENTY.NetworkType==constant:ZONE
FIND.Path ==
NETWORK:GENERIC>ZONE:TEMPLATE>
ZONE:DCN<L3DOMAIN:DCN>INGRESSACL>
INGRESSACLENTY@status=INSTANTIATED
SET.Running_Status ==          INSTANTIATED.
Set.Status ==                   ACTIVE.
EXECUTE.Workflow ==
    “WF_TS_ACTIVATE_SDN_INGRESSACLENTY_POLICY”
EXECUTE.Inactive==              false
ROLLBACK.Behaviour_on_error ==  STOP
ROLLBACK.Number_of_retries ==   0
ROLLBACK.Workflow ==
    “WF_TS_DEACTIVATE_SDN_INGRESSACLENTY_POLICY”
DATA.Lock ==                    true
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a “INGRESSACLENTY” in Status INSTANTIATED in the DDBB . Notice that we are not trying to get a NETWORK:GENERIC in status INSTANTIATED. The TD it is going to look for and artifact that matches the condition present in the FIND.Condition:  
 “GENERAL.Name==INGRESSACL\_%GENERAL.Name%\_PolicyBase&&ACLENTY.LocationType==constant:ZONE&&ACLENTY.NetworkType==constant:ZONE” reachable by the Path present in the category FIND.Path.

Once found , the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, this is “WF\_TS\_DEACTIVATE\_SDN\_INGRESSACLENTY\_POLICY”, but in this case, we have a “STOP” as value set for behavior, so no Rollback it is going to be initiated, the execution will continue without noticing.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as “Locked”.

2.12 TLD ACTIVATE DCN POLICIES: ACTIVATE\_EGRESS\_ENTRY

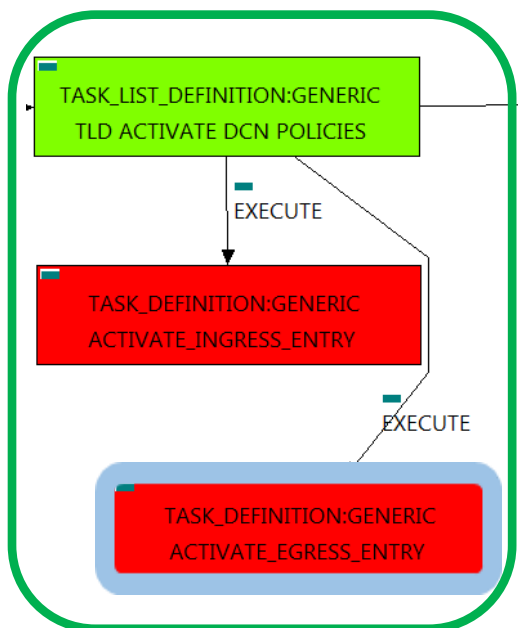


Figure 12: Activation of the Egress Entry Policies for Virtual Link.

The TDs that have present in the their names “Activate”, are Task Definitions responsible of the activation in the platform targeted and the updating of the status in the platform and the DDBB, in this case, the artifact that is going to be activated is a “EGRESSACLENTY”, this means, when this workflow finish, we will have a EGRESSACLENTY with status ACTIVE associated to the EGRESSACL policy, and finally related to the VIRTUAL\_LINK that it is going to be used it in the activation.

Targets of the TASK DEFINITION: STATUS of the TD:  
 ENABLED

```

GENERAL.Name == ACTIVATE_EGRESS_ENTRY
FIND.MainArtifact== VIRTUAL_LINK>NETWORK:GENERIC
FIND.Condition ==
GENERAL.Name==EGRESSACL_%GENERAL.Name%_PolicyBase&&
ACLENTY.LocationType==constant:ZONE&&
ACLENTY.NetworkType==constant:ZONE
FIND.Path ==
NETWORK:GENERIC>ZONE:TEMPLATE>
ZONE:DCN<L3DOMAIN:DCN>EGRESSACL>
EGRESSACLENTY@status=INSTANTIATED
SET.Running_Status == INSTANTIATED.
Set.Status == ACTIVE.
EXECUTE.Workflow ==
    “WF_TS_ACTIVATE_SDN_EGRESSACLENTY_POLICY”
EXECUTE.Inactive== false
ROLLBACK.Behaviour_on_error == STOP
ROLLBACK.Number_of_retries == 0
ROLLBACK.Workflow ==
    “WF_TS_DEACTIVATE_SDN_EGRESSACLENTY_POLICY”
DATA.Lock == true
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a “EGRESSACLENTY” in Status INSTANTIATED in the DDBB . Notice that we are not trying to get a NETWORK:GENERIC in status INSTANTIATED. The TD it is going to look for and artifact that matches the condition present in the FIND.Condition:

“GENERAL.Name==EGRESSACL\_%GENERAL.Name%\_PolicyBase&&ACLENTY.LocationType==constant:ZONE&&ACLENTY.NetworkType==constant:ZONE” reachable by the Path present in the category FIND.Path.

Once found , the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, this is “WF\_TS\_DEACTIVATE\_SDN\_EGRESSACLENTY\_POLICY”, but in this case, we have a “STOP” as value set for behavior, so no Rollback it is going to be initiated, the execution will continue without noticing.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as “Locked”.

2.13 TLD ACTIVATE DCN POLICIES: ACTIVATE\_INGRESS\_ENTRY\_ANY

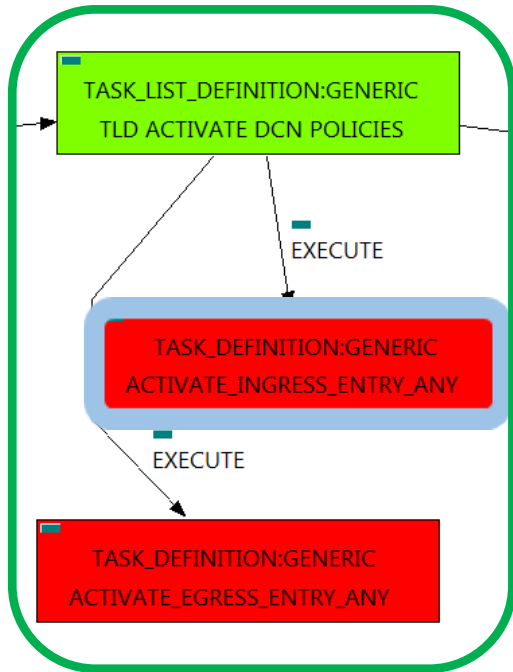


Figure 13: Activation of Ingress Entry policies for the VL, type to ANY.

The TDs that have present in the their names “Activate”, are Task Definitions responsible of the activation in the platform targeted and the updating of the status in the platform and the DDBB, in this case, the artifact that is going to be activated is a “INGRESSACLENTY”, this means, when this workflow finish, we will have a INGRESSACLENTY with status ACTIVE associated to the INGRESSACL policy, and finally related to the VIRTUAL\_LINK that it is going to be used it in the activation.

These policies allow the traffic in both direction from the element that owns the policy to the rest of the elements reachable underneath the ORGANIZATION artifact.

Once finished, the TD will be activated the rest of the INGRESSACLENTY\_Any policies waiting for activation after the end of the first TD for activate INGRESS policies.

Targets of the TASK DEFINITION: STATUS of the TD:  
ENABLED

```

GENERAL.Name ==                ACTIVATE_INGRESS_ENTRY
FIND.MainArtifact==            VIRTUAL_LINK>NETWORK:GENERIC
FIND.Condition ==
GENERAL.Name==INGRESSACL_%GENERAL.Name%_ANY&&
ACLENTY.LocationType==constant:ZONE&&
ACLENTY.NetworkType==constant:ANY
FIND.Path ==
NETWORK:GENERIC>ZONE:TEMPLATE>
ZONE:DCN<L3DOMAIN:DCN>INGRESSACL>
INGRESSACLENTY@status=INSTANTIATED
SET.Running_Status ==          INSTANTIATED.
Set.Status ==                  ACTIVE.
EXECUTE.Workflow ==
    “WF_TS_ACTIVATE_SDN_INGRESSACLENTY_POLICY”
EXECUTE.Inactive==            false
ROLLBACK.Behaviour_on_error == STOP
ROLLBACK.Number_of_retries == 0
DATA.Lock ==                   true
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a “INGRESSACLENTY” in Status INSTANTIATED in the DDBB . Notice that we are not trying to get a NETWORK:GENERIC in status INSTANTIATED. The TD it is going to look for and artifact that matches the condition present in the FIND.Condition:

“GENERAL.Name==INGRESSACL\_%GENERAL.Name%\_ANY&&ACLENTY.LocationType==constant:ZONE&&ACLENTY.NetworkType==constant:ANY” reachable by the Path present in the category FIND.Path.

Once found , the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, but in this case, we have a “STOP” as value set for behavior, so no Rollback it is going to be initiated, the execution will continue without noticing.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as “Locked”.

2.14 TLD ACTIVATE DCN POLICIES: ACTIVATE\_EGRESS\_ENTRY\_ANY

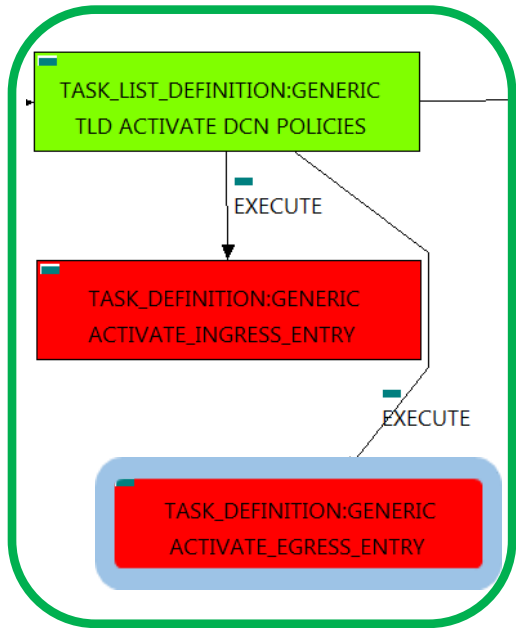


Figure 14: Activation of Egress Entry policies for the VL, type to ANY..

The TDs that have present in the their names “Activate”, are Task Definitions responsible of the activation in the platform targeted and the updating of the status in the platform and the DDBB, in this case, the artifact that is going to be activated is a “EGRESSACLENTY”, this means, when this workflow finish, we will have a EGRESSACLENTY with status ACTIVE associated to the EGRESSACL policy, and finally related to the VIRTUAL\_LINK that it is going to be used it in the activation.

Targets of the TASK DEFINITION: STATUS of the TD:  
 ENABLED

```

GENERAL.Name ==                ACTIVATE_EGRESS_ENTRY
FIND.MainArtifact==            VIRTUAL_LINK>NETWORK:GENERIC
FIND.Condition ==
GENERAL.Name==EGRESSACL_%GENERAL.Name%_ANY&&
ACLENTY.LocationType==constant:ZONE&&
ACLENTY.NetworkType==constant:ANY
FIND.Path ==
NETWORK:GENERIC>ZONE:TEMPLATE>
ZONE:DCN<L3DOMAIN:DCN>EGRESSACL>
EGRESSACLENTY@status=INSTANTIATED
SET.Running_Status ==          INSTANTIATED.
Set.Status ==                  ACTIVE.
EXECUTE.Workflow ==
    “WF_TS_ACTIVATE_SDN_EGRESSACLENTY_POLICY”
EXECUTE.Inactive==             false
ROLLBACK.Behaviour_on_error == STOP
ROLLBACK.Number_of_retries == 0
DATA.Lock ==                   true
    
```

The Workflow present in EXECUTE.Workflow attribute it is going to seek a “EGRESSACLENTY” in Status INSTANTIATED in the DDBB . Notice that we are not trying to get a NETWORK:GENERIC in status INSTANTIATED. The TD it is going to look for and artifact that matches the condition present in the FIND.Condition:  
 “GENERAL.Name==EGRESSACL\_%GENERAL.Name%\_ANY&&ACLENTY.LocationType==constant:ZONE&&ACLENTY.NetworkType==constant:ANY” reachable by the Path present in the category FIND.Path.

Once found , the WF will start the activation, if the activation it is successful we set the status of the artifact as the SET.Status attribute dictates. The attribute SET.Running\_Status concern about the temporal status that the artifact it is going to maintain until the final change of status that comes from SET.Status.

In case of error during the execution, the TD will jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, but in this case, we have a “STOP” as value set for behavior, so no Rollback it is going to be initiated, the execution will continue without noticing.

Due to that the value of the attribute DATA.Lock is true, when the Task Definition has finished the artifact that was used in the workflow executed will be set as “Locked”.

2.15 . TLD VIRTUAL\_LINK CHANGE STATUS:  
VIRTUAL\_LINK\_STATUS\_CHANGE.

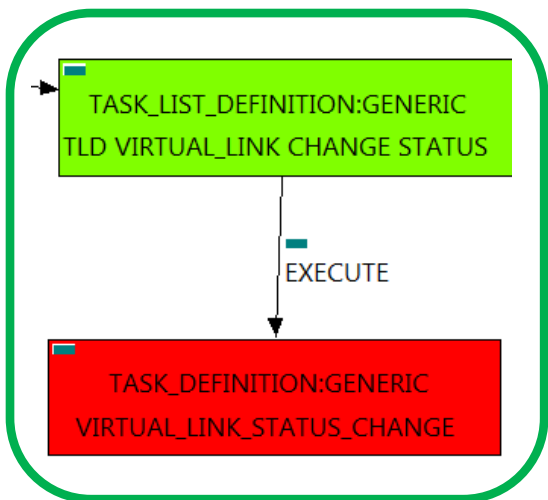


Figure 15: Status change Virtual Link.

The TDs that have present in their names “Status Change”, are Task Definitions responsible of the change in the status of the entity associated, in this case a VIRTUAL\_LINK. When the TD has finished we will have an VIRTUAL\_LINK with status ACTIVE in case of successful execution, or status ERROR in case of error, or simply not any change in the status because a ROLLBACK during the execution.

Targets of the TASK DEFINITION:  
ENABLED

STATUS of the TD:

GENERAL.Name ==	VIRTUAL_LINK_STATUS_CHANGE
FIND.Condition ==	<b>status==constant:INSTANTIATED</b>
SET.Running_Status ==	INSTANTIATED.
SET.Status ==	ACTIVE.
EXECUTE.Inactive==	false
ROLLBACK.Behaviour_on_error ==	STOP
ROLLBACK.Number_of_retries ==	0
DATA.Lock ==	true

The TASK\_DEFINITION do not execute any workflow, with the attributes present in the categories it is enough to change the status of the entity.

In case of error during the execution, the workflow jump to the ROLLBACK category, If the “Behaviour\_on\_error” attribute its set on “ROLLBACK” the WF will start the execution of the Workflow present in the attribute with the same name in the category ROLLBACK, but in this case, we have a “STOP” set as behavior, so no Rollback it is going to be initiated, so the execution it is going to end here in case of error.