Managing Existing Deployments

After a deployment is created successfully, the resources within a deployment can be updated. As part of deployment management, you can add or delete resources, or update the configuration of the existing resources. These updates can be made in a running deployment. This chapter describes managing these resources in detail.

Updating an Existing Deployment

You can update an existing deployment by adding new VM groups, interfaces, networks, and so on. You can also update the day-0 configuration, KPIs and Rules for the VM groups. You can add or delete a vm_group, add or delete an ephemeral network in a vm_group, and add or delete an interface in a VM group after successful deployment.

On OpenStack, you can perform all the updates such as add or delete a vm_group, ephemeral network vm_group, and an interface in a single deployment.

During a service update, auto-recovery actions may drive the service to an inconsistent state. To prevent triggering of auto-recovery actions, monitors are disabled before the service update workflow, and enabled after the update is complete.

> **Note** During VM recovery in the middle of a service update request, the Northbound client may receive a SERVICE_UPDATED FAILURE notification even before receiving the VM recovery notifications. It is recommended to check the service until it moves to the SUCCESS or ERROR state before sending manual recovery or other service level requests.

Updating an existing deployment is supported both on OpenStack and VMware vCenter. The table below lists the components that can be updated in an existing deployment.

Table 1: Updating an Existing Deployment on OpenStack, VMware vCenter and vCloud Director

Update	OpenStack	VMware vCenter	vCloud Director
Adding a VM group	Supported	Supported	Supported
Deleting a VM group	Supported	Supported	Supported

Update	OpenStack	VMware vCenter	vCloud Director
Deleting VM groups when the service is in error state	Supported	Supported	Not supported
Adding an ephemeral network	Supported	Not supported	Not supported
Deleting an ephemeral network	Supported	Not supported	Not supported
Adding an interface	Supported	Not supported	Not supported
Deleting an interface	Supported	Not supported	Not supported
Updating an interface	Supported	Supported	Not supported
Adding a Static IP pool	Supported	Not supported	Not supported
Deleting a Static IP pool	Supported	Not supported	Not supported
Updating the day-0 config in a VM group	Supported	Supported	Not supported
Updating the KPIs and rules	Supported	Supported	Not supported
Updating the number of VMs (Scale In or Scale Out) in a VM group	Supported	Supported	Not supported
Updating the recovery wait time	Supported	Supported	Not supported
Updating the recovery policy	Supported	Not supported	Not supported
Updating an image	Supported	Not supported	Not supported

Note Updating an existing deployment on multiple OpenStack VIMs is also supported. However, the locator attribute within the vm group cannot be updated. For more information on Deploying VMs on Multiple VIMs, see Deploying VNFs on Multiple OpenStack VIMs.

Adding a VM Group

You can add or delete a vm_group from a running deployment using the existing images and flavors.

NETCONF request to add a vm_group:

```
<esc_datamodel xmlns="http://www.cisco.com/esc/esc"> <tenants><tenant>
  <name>Admin</name>
    <deployments>
```

```
          <deployment>
           <deployment_name>NwDepModel_nosvc</deployment_name>

           <vm_group>
               <image></image>
               <Flavor></Flavor>
               .........
           </vm_group>
           <vm_group>
    <image></image>
  <Flavor></Flavor>
 .........
           </vm_group>
           <vm_group>
  <image></image>
  <Flavor></Flavor>
 .........
           </vm_group>
          </deployment>
</deployments>
          </tenant></tenants>
</esc_datamodel>
```

NETCONF notification upon successful addition of a VM Group:

```
UPDATE SERVICE REQUEST RECEIVED (UNDER TENANT)
           VM_DEPLOYED
             VM_ALIVE
           SERVICE_UPDATED
UPDATE SERVICE REQUEST RECEIVED (UNDER TENANT)
```

Deleting a VM Group

NETCONF request to delete a vm_group:

```
<esc_datamodel xmlns="http://www.cisco.com/esc/esc">
 <tenants><tenant>
  <name>Admin</name>
   <deployments>
    <deployment>
     <deployment_name>NwDepModel_NoSvc</deployment_name>

     <vm_group>
         <image></image>
         <Flavor></Flavor>
         .........
     </vm_group>
     <vm_group nc:operation="delete">
 <image></image>
 <Flavor></Flavor>
 .........
     </vm_group>
     <vm_group nc:operation="delete">
 <image></image>
 <Flavor></Flavor>
  .........
     </vm_group>
    </deployment>
</deployments>
        </tenant></tenants>
</esc_datamodel>
```

NETCONF notification upon successful deletion of vm_group:

```
UPDATE SERVICE REQUEST RECEIVED (UNDER TENANT)
            VM_UNDEPLOYED
            SERVICE_UPDATED
UPDATE SERVICE REQUEST RECEIVED (UNDER TENANT)
```

Deleting VM Groups in Error State

You can now delete vm groups when the deployment is in error state by performing a deployment update.
However, additional configurations to the vm groups such as adding one or more vm groups, or changing the
attribute value of a different vm group while deleting a particular vm group are not allowed.

Adding an Ephemeral Network in a VM Group

You can add an ephemeral network in a vm_group using the existing images and flavors.

NETCONF request to add an ephemeral in a vm_group:

```
<esc_datamodel xmlns="http://www.cisco.com/esc/esc"> <tenants><tenant>
  <name>Admin</name>
   <deployments>
    <deployment>
     <deployment_name>NwDepModel_nosvc</deployment_name>
      <networks>
      <network>
.........
</network>
<network>
.........
</network>
<network>
.........
</network>
     </networks>
     <vm_group>
        <image></image>
        <Flavor></Flavor>
        .........
     </vm_group>
  </deployment>
</deployments>
     </tenant></tenants>
</esc_datamodel>
```

NETCONF notification upon successful addition of an ephemeral network in a vm_group:

```
UPDATE SERVICE REQUEST RECEIVED (UNDER TENANT)
            CREATE_NETWORK
            CREATE_SUBNET
          SERVICE_UPDATED
UPDATE SERVICE REQUEST RECEIVED (UNDER TENANT)
```

Deleting an Ephemeral Network in a VM Group

NETCONF request to delete an ephemeral network in a vm_group

```
<esc_datamodel xmlns="http://www.cisco.com/esc/esc"> <tenants><tenant>
  <name>Admin</name>
   <deployments>
    <deployment>
     <deployment_name>NwDepModel</deployment_name>
      <networks>
      <network nc:operation="delete">
.........
```

```
      </network>
      <network>
      .........
      </network>
      <network nc:operation="delete">
      .........
      </network>
           </networks>
           <vm_group>
               <image></image>
               <Flavor></Flavor>
           .........
           </vm_group>
       </deployment>
</deployments>
       </tenant></tenants>
</esc_datamodel>
```

NETCONF notification upon successful deletion of an ephemeral network in a vm_group:

```
UPDATE SERVICE REQUEST RECEIVED (UNDER TENANT)
          DELETE_SUBNET
          DELETE_NETWORK
          SERVICE_UPDATED
UPDATE SERVICE REQUEST RECEIVED (UNDER TENANT)
```

Adding an Interface in a VM Group (OpenStack)

You can add an interface in a vm_group from a running deployment using the existing images and flavors.

NETCONF request to add an interface in a vm_group:

```
<interfaces>
  <interface>
    <nicid>0</nicid>
    <network>my-network</network>
  </interface>
  <interface>
    <nicid>1</nicid>
    <network>utr-net</network>
  </interface>
  <interface>
    <nicid>2</nicid>
    <network>utr-net-1</network>
  </interface>
</interfaces>
```

Note ESC Release 2.3 and later supports adding and deleting interfaces using the ESC Portal for OpenStack.

ESC supports adding and deleting interfaces from a vm_group using both REST and NETCONF APIs.

Deleting an Interface in a VM Group (OpenStack)

NETCONF request to delete an interface in a vm_group:

```
<interfaces>
  <interface>
    <nicid>0</nicid>
    <network>my-network</network>
```

```
    </interface>
    <interface>
      <nicid>1</nicid>
      <network>utr-net</network>
    </interface>
    <interface nc:operation="delete">
      <nicid>2</nicid>
      <network>utr-net-1</network>
    </interface>
</interfaces>
```

You can simultaneously add and delete interfaces in a VM group (OpenStack only) in the same deployment request.

Note ESC does not support the following:

- Updating the properties of an existing vm_group, network or subnet.

- Updating the image and flavor of a vm_group.

- Blank names for resource names (that is, vm_group, network, subnet or Interface).

In Cisco ESC Release 2.0 or earlier, the ephemeral networks or subnets can only be added or deleted.

ESC does not support the day 0 configuration of new interfaces added during a deployment update. You must perform additional configuration separately in the VNF as part of the day-n configuration. If you delete an interface with token replacement, you must update the day 0 configuration to remove that interface. In future, ESC will use the new day 0 configuration for recovery.

A new interface without the nic ids is not configured during a deployment update.

New interfaces with existing day 0 configuration are configured.

Updating an Interface (OpenStack)

Updating an interface on OpenStack deletes the previous interface and creates a new one with the existing nic id.

The datamodel is as follows:

```
<interfaces>
              <interface>
                <nicid>0</nicid>
                <network>my-network</network>
              </interface>
               <interface>
                <nicid>1</nicid>
                <network>utr-net-2</network>
              </interface>
        </interfaces>
```

A VM_UPDATED notification is sent with the details of all the interfaces in a VM, followed by a SERVICE_UPDATED notification after the workflow is updated.

```
<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2015-07-25T00:45:27.64+00:00</eventTime>
  <escEvent xmlns="http://www.cisco.com/esc/esc">
    <status>SUCCESS</status>
    <status_code>200</status_code>
```

```
        <status_message>VM has been updated successfully. vm:
utr-80__7515__utr-80__utr-80utr-80utr-801.2__0__utr-80__0</status_message>
        <svcname>utr-80</svcname>
        <svcversion>1.2</svcversion>
        <depname>utr-80</depname>
        <tenant>utr-80</tenant>
        <svcid>c1294ad1-fd7b-4a73-8567-335160dce90f</svcid>
        <depid>ecedf755-502c-473a-82f2-db3a5485fdf5</depid>
        <vm_group>utr-80</vm_group>
        <vm_source>
          <vmid>4b20024f-d8c8-4b1a-8dbe-3bf1011a0bcb</vmid>
          <hostid>71c7f3afb281485067d8b28f1734ec6b63f9e3225045c581168cc39d</hostid>
          <hostname>my-server</hostname>
          <interfaces>
            <interface>
              <nicid>0</nicid>
              <port_id>6bbafbf5-51a1-48c0-a4a5-cd6092657e5c</port_id>
              <network>7af5c7df-6246-4d53-91bd-aa12a1607656</network>
              <subnet>7cb6815e-3023-4420-87d8-2b10efcbe14e</subnet>
              <ip_address>192.168.0.10</ip_address>
              <mac_address>fa:16:3e:bc:07:d5</mac_address>
              <netmask>255.255.255.0</netmask>
              <gateway>192.168.0.1</gateway>
            </interface>
            <interface>
              <nicid>1</nicid>
              <port_id>6d54d3a8-b793-40b8-9a32-c7e2f08e0917</port_id>
              <network>4f85613a-d3fc-4b49-9cb0-b91d4360918b</network>
              <subnet>c3724a64-ffed-43b6-aba8-63287c5344ea</subnet>
              <ip_address>10.91.90.2</ip_address>
              <mac_address>fa:16:3e:49:d0:00</mac_address>
              <netmask>255.255.255.0</netmask>
              <gateway>10.91.90.1</gateway>
            </interface>
            <interface>
              <nicid>3</nicid>
              <port_id>04189123-fc7a-4418-877b-61c24a5e8508</port_id>
              <network>f9c7978f-800e-4bfc-bc20-1c29acef87d9</network>
              <subnet>63ae5e39-c41a-4b28-9ac7-ed94b5e477b0</subnet>
              <ip_address>172.16.0.97</ip_address>
              <mac_address>fa:16:3e:5e:2e:e3</mac_address>
              <netmask>255.240.0.0</netmask>
              <gateway>172.16.0.1</gateway>
            </interface>
          </interfaces>
        </vm_source>
        <vm_target>
      </vm_target>
        <event>
          <type>VM_UPDATED</type>
        </event>
      </escEvent>
    </notification>
```

> **Note** • Interfaces are unique based on nic ids. If new interfaces are added, they should have different nic ids. If an interface is edited, and has the same nic id, it is considered as an update to the existing interface.

Updating an Interface (VMware vCenter)

You can update a network associated with an interface, while updating an existing deployment. Replace the old network name with a new name in the deployment request to update the network. The port group on the interfaces is updated for all VMs in the VM group during the network update.

Note IP update is not supported during an interface update on VMware vCenter.

Static IP and mac pool updates are not supported during an interface update on VMware vCenter when min > 1 in a vm group.

The datamodel update is as follows:

Existing datamodel:

```
<interface>
  <nicid>1</nicid>
  <network>MgtNetwork</network>
</interface>
```

New datamodel:

```
<interface>
  <nicid>1</nicid>
  <network>VNFNetwork</network>
</interface>
```

The following notification is received after successful update:

```
<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2016-08-17T12:03:12.518+00:00</eventTime>
  <escEvent xmlns="http://www.cisco.com/esc/esc">
    <status>SUCCESS</status>
    <status_code>200</status_code>
    <status_message>Updated 1 interface: [net=VNFNetwork,nicid=1]</status_message>
    <depname>u1-asa</depname>
    <tenant>admin</tenant>
    <tenant_id>SystemAdminTenantId</tenant_id>
    <depid>90139aa1-9705-4b07-9963-d60691d3b0ad</depid>
    <vm_group>utr-asa-1</vm_group>
    <vm_source>
      <vmid>50261fbc-88a0-8601-71a9-069460720d4f</vmid>
      <hostid>host-10</hostid>
      <hostname>172.16.103.14</hostname>
      <interfaces>
        <interface>
          <nicid>1</nicid>
          <type>virtual</type>
          <port_id/>
          <network>VNFNetwork</network>
          <subnet/>
          <ip_address>192.168.0.254</ip_address>
          <mac_address>00:50:56:a6:d8:1d</mac_address>
        </interface>
      </interfaces>
    </vm_source>
    <vm_target>
  </vm_target>
    <event>
      <type>VM_UPDATED</type>
    </event>
```

```
        </escEvent>
</notification>
<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2016-08-17T12:03:12.553+00:00</eventTime>
  <escEvent xmlns="http://www.cisco.com/esc/esc">
    <status>SUCCESS</status>
    <status_code>200</status_code>
    <status_message>Service group update completed successfully</status_message>
    <depname>u1-asa</depname>
    <tenant>admin</tenant>
    <tenant_id>SystemAdminTenantId</tenant_id>
    <depid>90139aa1-9705-4b07-9963-d60691d3b0ad</depid>
    <vm_source>
  </vm_source>
    <vm_target>
  </vm_target>
    <event>
       <type>SERVICE_UPDATED</type>
    </event>
  </escEvent>
</notification>
```

Updating an Interface (Cloud Services Platform)

You can now configure and update the Vlan, type and bandwidth properties of an interface using the interface extensions for a CSP deployment. The admin stuatus (admin_state_up) and network attributes can be configured and updated using interfaces.

The **container name** attribute must match the **nicid** value. For example, if the **container name** is 1, the **nicid** value must also be 1 for configuring and updating the interface properties.

Vlan

To configure and update the vlan property, execute the following command from ESC:

esc_nc_cli --user <username> --password <password> edit-config interfaceVlan.xml

The sample interfaceVlan.xml is as follows:

```
        <interfaces>
            <interface>
              <nicid>0</nicid>
              <type>virtual</type>
              <model>virtio</model>
              <network>Eth0-2</network>
              <ip_address>192.168.24.45</ip_address>
              <admin_state_up>true</admin_state_up>
           </interface>
           <interface>
              <nicid>1</nicid>
              <type>virtual</type>
              <model>virtio</model>
              <network>Eth0-2</network>
              <admin_state_up>true</admin_state_up>
            </interface>
        </interfaces>
        ......
         .....
        <extensions>
          <extension>
            <name>interfaces</name>
            <containers>
```

```
                        <container>
                         <name>0</name>
                         <properties>
                           <property>
                             <name>passthroughMode</name>
                             <value>none</value>
                           </property>
                           <property>
                             <name>tagged</name>
                             <value>false</value>
                           </property>
                           <property>
                             <name>type</name>
                             <value>access</value>
                           </property>
                           <property>
                             <name>vlan</name>
                             <value>1</value>
                           </property>
                         </properties>
                        </container>
                       <container>
                           <name>1</name>
                           <properties>
                             <property>
                               <name>passthroughMode</name>
                               <value>none</value>
                             </property>
                             <property>
                               <name>tagged</name>
                               <value>false</value>
                             </property>
                             <property>
                               <name>type</name>
                               <value>access</value>
                             </property>
                             <property>
                               <name>bandwidth</name>
                               <value>750</value>
                             </property>
                             <property>
                               <name>vlan</name>
                               <value>11</value>
                             </property>
                           </properties>
                         </container>
                       </containers>
                    </extension>
                    <extension>
                      <name>serial_ports</name>
                      <containers>
                        <container>
                          <name>0</name>
                          <properties>
                            <property>
                              <name>serial_type</name>
                              <value>console</value>
                            </property>
                          </properties>
                        </container>
                      </containers>
                    </extension>
                    <extension>
                      <name>image</name>
```

```
                <properties>
                  <property>
                    <name>disk-resize</name>
                    <value>true</value>
                  </property>
                  <property>
                    <name>disk_type</name>
                    <value>virtio</value>
                  </property>
                </properties>
              </extension>
            </extensions>
```

Bandwidth

You can configure and update the bandwidth for an interface. The value of bandwidth is in megabits per second. It must be a positive integer.

To configure and update the bandwidth, execute the following command from ESC:

esc_nc_cli --user <username> --password <password> edit-config bandwidth.xml

The sample bandwidth.xml is as follows:

```
          <properties>
                <property>
                  <name>passthroughMode</name>
                  <value>none</value>
                </property>
                <property>
                  <name>tagged</name>
                  <value>false</value>
                </property>
                <property>
                  <name>type</name>
                  <value>access</value>
                </property>
                <property>
                  <name>bandwidth</name>
                  <value>750</value>
                </property>
                <property>
                  <name>vlan</name>
                  <value>11</value>
                </property>
              </properties>
            </container>
          </containers>
        </extension>
        <extension>
          <name>serial_ports</name>
          <containers>
            <container>
              <name>0</name>
              <properties>
                <property>
                  <name>serial_type</name>
                  <value>console</value>
                </property>
              </properties>
            </container>
          </containers>
        </extension>
        <extension>
```

```
                    <name>image</name>
                    <properties>
                      <property>
                        <name>disk-resize</name>
                        <value>true</value>
                      </property>
                      <property>
                        <name>disk_type</name>
                        <value>virtio</value>
                      </property>
                    </properties>
                  </extension>
                </extensions>
```

Type

The valid values for the property *type* are access and trunk only. To configure and update the property *type*, execute the following command from ESC:

esc_nc_cli --user <username> --password <password> edit-config interfaceType.xml

The sample interfaceType.xml is as follows:

```
        <extensions>
              <extension>
                <name>interfaces</name>
                <containers>
                    <container>
                     <name>0</name>
                     <properties>
                       <property>
                         <name>passthroughMode</name>
                         <value>none</value>
                       </property>
                       <property>
                         <name>tagged</name>
                         <value>false</value>
                       </property>
                       <property>
                         <name>type</name>
                         <value>access</value>
                       </property>
                       <property>
                         <name>vlan</name>
                         <value>1</value>
                       </property>
                     </properties>
                   </container>
                  <container>
                     <name>1</name>
                     <properties>
                       <property>
                         <name>passthroughMode</name>
                         <value>none</value>
                       </property>
                       <property>
                         <name>tagged</name>
                         <value>false</value>
                       </property>
                       <property>
                         <name>type</name>
                         <value>access</value>
                       </property>
                       <property>
```

```
                        <name>bandwidth</name>
                        <value>750</value>
                    </property>
                    <property>
                        <name>vlan</name>
                        <value>11</value>
                    </property>
                  </properties>
                </container>
              </containers>
          </extension>
          <extension>
            <name>serial_ports</name>
            <containers>
              <container>
                <name>0</name>
                <properties>
                  <property>
                    <name>serial_type</name>
                    <value>console</value>
                  </property>
                </properties>
              </container>
            </containers>
          </extension>
          <extension>
            <name>image</name>
            <properties>
              <property>
                <name>disk-resize</name>
                <value>true</value>
              </property>
              <property>
                <name>disk_type</name>
                <value>virtio</value>
              </property>
            </properties>
          </extension>
        </extensions>
```

Admin Status

The admin_state_up attribute in the interface allows you to enable or disable the VNIC. The admin_state_up value can be set to true or false. If true, then vNIC is enabled. If the admin_state_up value is not configured through ESC, then the status is **UP** on CSP. To configure and update the admin_state_up attribute, execute the following command from ESC:

esc_nc_cli --user <username> --password <password> edit-config adminStateUp.xml

The sample adminStateUp.xml is as follows:

```
<interfaces>
            <interface>
            <nicid>0</nicid>
            <type>virtual</type>
            <model>virtio</model>
            <network>Eth0-2</network>
            <ip_address>192.168.24.45</ip_address>
            <admin_state_up>true</admin_state_up>
          </interface>
        <interface>
            <nicid>1</nicid>
            <type>virtual</type>
```

```
                    <model>virtio</model>
                    <network>Eth0-2</network>
                    <admin_state_up>false</admin_state_up>
                 </interface>
              </interfaces>
         ........
          .......
         <extensions>
           <extension>
             <name>interfaces</name>
             <containers>
                 <container>
                  <name>0</name>
                  <properties>
                    <property>
                       <name>passthroughMode</name>
                       <value>none</value>
                    </property>
                    <property>
                       <name>tagged</name>
                       <value>false</value>
                    </property>
                    <property>
                       <name>type</name>
                       <value>access</value>
                    </property>
                    <property>
                       <name>vlan</name>
                       <value>1</value>
                    </property>
                  </properties>
                 </container>
                <container>
                   <name>1</name>
                   <properties>
                     <property>
                       <name>passthroughMode</name>
                       <value>none</value>
                     </property>
                     <property>
                       <name>tagged</name>
                       <value>false</value>
                     </property>
                     <property>
                       <name>type</name>
                       <value>access</value>
                     </property>
                     <property>
                       <name>vlan</name>
                       <value>11</value>
                     </property>
                   </properties>
                 </container>
             </containers>
           </extension>
           <extension>
             <name>serial_ports</name>
             <containers>
               <container>
                 <name>0</name>
                 <properties>
                   <property>
                      <name>serial_type</name>
                      <value>console</value>
```

```
            </property>
          </properties>
        </container>
      </containers>
    </extension>
    <extension>
      <name>image</name>
      <properties>
        <property>
          <name>disk-resize</name>
          <value>true</value>
        </property>
        <property>
          <name>disk_type</name>
          <value>virtio</value>
        </property>
      </properties>
    </extension>
  </extensions>
......................
```

Network

You can configure and update the network attribute through the interface. To configure and update the network, execute the following command from ESC:

esc_nc_cli --user <username> --password <password> edit-config NetworkNameChange.xml

The sample NetworkNameChange.xml is as follows:

```
<interfaces>
        <interface>
        <nicid>0</nicid>
        <type>virtual</type>
        <model>virtio</model>
        <network>Eth0-2</network>
        <ip_address>192.168.24.45</ip_address>
        <admin_state_up>true</admin_state_up>
      </interface>
     <interface>
        <nicid>1</nicid>
        <type>virtual</type>
        <model>virtio</model>
        <network>Eth0-2</network>
        <admin_state_up>false</admin_state_up>
      </interface>
    </interfaces>
    .........
    ...........
    <extensions>
      <extension>
        <name>interfaces</name>
        <containers>
          <container>
            <name>0</name>
            <properties>
              <property>
                <name>passthroughMode</name>
                <value>none</value>
              </property>
              <property>
                <name>tagged</name>
                <value>false</value>
              </property>
```

```
                            <property>
                               <name>type</name>
                               <value>access</value>
                            </property>
                            <property>
                               <name>vlan</name>
                               <value>1</value>
                            </property>
                         </properties>
                      </container>
                    <container>
                         <name>1</name>
                         <properties>
                            <property>
                               <name>passthroughMode</name>
                               <value>none</value>
                            </property>
                            <property>
                               <name>tagged</name>
                               <value>false</value>
                            </property>
                            <property>
                               <name>type</name>
                               <value>access</value>
                            </property>
                            <property>
                               <name>vlan</name>
                               <value>11</value>
                            </property>
                         </properties>
                      </container>
                  </containers>
               </extension>
               <extension>
                  <name>serial_ports</name>
                  <containers>
                     <container>
                         <name>0</name>
                         <properties>
                            <property>
                               <name>serial_type</name>
                               <value>console</value>
                            </property>
                         </properties>
                      </container>
                  </containers>
               </extension>
               <extension>
```

Adding a Static IP Pool

You can add a new static IP pool to the existing deployment.

NETCONF request to add a static IP pool:

```
<scaling>
<min_active>2</min_active>
<max_active>5</max_active>
<elastic>true</elastic>
<static_ip_address_pool>
<network>IP-pool-network-A</network>
<ip_address_range>
<start>172.16.5.13</start>
<end>172.16.5.13</end>
```

```
</ip_address_range>
</static_ip_address_pool>
<static_ip_address_pool>
<network>IP-pool-network-B</network>
<ip_address_range>
<start>172.16.7.13</start>
<end>172.16.7.13</end>
</ip_address_range>
</static_ip_address_pool>
</scaling>
```

Deleting a Static IP Pool

You can delete the existing IP pools in a running deployment.

NETCONF request to delete a static IP pool:

```
<scaling>
<min_active>2</min_active>
<max_active>5</max_active>
<elastic>true</elastic>
<static_ip_address_pool>
<network>IP-pool-network-A</network>
<ip_address_range>
<start>172.16.5.13</start>
<end>172.16.5.13</end>
</ip_address_range>
</static_ip_address_pool>
<static_ip_address_pool nc:operation="delete">
<network>IP-pool-network-B</network>
<ip_address_range>
<start>172.16.7.13</start>
<end>172.16.7.13</end>
</ip_address_range>
</static_ip_address_pool>
</scaling>
```

Note
- You cannot update an already existing static IP pool in an existing deployment. You can only add a new static IP pool, or delete if the static IP pool is not in use.

- You cannot update the IP address of an interface. That is, you cannot deploy with one IP address, and then add a new IP in the same nic id.

The following scenarios are supported or rejected because of the dependencies within the static IP pools, interfaces, and networks.

Request	Supported or Rejected
Add or delete new static IP pools in single or different requests.	Supported
Add interfaces with static IP.	Supported
Add an interface and the corresponding IP pool in the same request.	Supported

Request	Supported or Rejected
Delete an interface, retaining the corresponding IP pool.	Supported
Delete an interface and its corresponding IP pool in the same request.	Supported
Delete an IP pool, when one of its IPs are being used in an interface in a VM.	Rejected
Add a network, and a static IP pool having different network in a single request.	Supported
To an existing network, add a corresponding interface and an IP pool in the same update.	Supported
Add a new network in an update, and a new corresponding IP pool in the next update.	Supported
Add an IP pool without corresponding network.	Rejected
Delete a network and the referencing IP pool in the same request, when none of the IPs are being used in any interfaces.	Supported
Delete a network which is being used in an IP pool and interface.	Rejected
To an existing network, add an interface and an IP pool in the same update.	Supported
Delete an IP pool that does not have any IPs used in interface, though the network with subnet is present.	Supported
Add an IP pool which already exists.	Request is accepted by NETCONF but no action taken
Update the IP addresses of an existing IP pool.	Rejected

Updating the Day 0 Configuration in a VM Group

To update (add, delete or change) the day-0 configuration of a VM group in an existing deployment, edit-config the deployment and update the configuration under config_data. The new day-0 config file is only applied on future deployment, which is triggered by either VM recovery (that is undeploy/deploy) or scale-out.

Note To change the existing day-0 config file, the URL or path must be specified. This enables ESC to detect the change that has occurred in the configuration.

In the example below, if a VM ALIVE event is not received, you can change the action from triggering auto recovery to simply logging the event.

Existing configuration:

```
<config_data>
  <configuration>
    <dst>WSA_config.txt</dst>

<file>https://172.16.73.167:4343/day0/cfg/vWSA/node/001-wsa/provider/Symphony_VNF_P-1B/file>

  </configuration>
  <configuration>
    <dst>license.txt</dst>

<file>https://172.16.73.167:4343/day0/cfg/vWSA/node/001-wsa/provider/Symphony_VNF_P-1B/wsa-license.txt</file>

  </configuration>
</config_data>
```

New configuration:

```
<config_data>
  <configuration>
    <dst>WSA_config.txt</dst>

<file>https://172.16.73.167:4343/day0/cfg/vWSA/node/001-wsa/provider/Symphony_VNF_P-1B/file>

  </configuration>
  <configuration>
    <dst>license.txt</dst>

<file>https://172.16.73.167:4343/day0/cfg/vWSA/node/002-wsa/provider/Symphony_VNF_P-1B/wsa-license.txt</file>

  </configuration>
</config_data>
```

SERVICE_UPDATED notification is received after updating the configuration.

```
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2016-05-05T00:35:15.359+00:00</eventTime>
  <escEvent xmlns="http://www.cisco.com/esc/esc">
    <status>SUCCESS</status>
    <status_code>200</status_code>
    <status_message>Service group update completed successfully</status_message>
    <depname>900cd7554d31-5454000964474c1cbc07256792e63240-cloudvpn</depname>
    <tenant>Symphony_VNF_P-1B</tenant>
    <tenant_id>3098b55808e84484a4f8bab2160a41a7</tenant_id>
    <depid>b7d566ce-1ee6-4147-8c23-c8bcb5d05fd4</depid>
    <vm_source/>
    <vm_target/>
    <event>
      <type>SERVICE_UPDATED</type>
    </event>
  </escEvent>
</notification>
```

For more information on day-0 configuration, see Day Zero Configuration.

Updating the KPIs and Rules

ESC allows updating KPIs and rules for a VM in the existing deployment. Edit the datamodel to update the KPIs and rules section.

For example, to change the *Polling Frequency* in an existing deployment, update the *<poll_frequency>* element in the KPI section of the datamodel.

Change *<poll_frequency>3</poll_frequency>* to *<poll_frequency>20</poll_frequency>* in the sample below.

```
<kpi>
          <event_name>VM_ALIVE</event_name>
          <metric_value>1</metric_value>
          <metric_cond>GT</metric_cond>
          <metric_type>UINT32</metric_type>
          <metric_collector>
            <type>ICMPPing</type>
            <nicid>0</nicid>
            <poll_frequency>3</poll_frequency>
            <polling_unit>seconds</polling_unit>
            <continuous_alarm>false</continuous_alarm>
          </metric_collector>
        </kpi>
```

Similarly, the existing rules can be updated for a VM. For example, to switch off the auto- recovery on a boot failure and to log the action, update *<action>FALSE recover autohealing</action>* to *<action>FALSE log</action>* in the sample below.

```
<rules>
          <admin_rules>
            <rule>
              <event_name>VM_ALIVE</event_name>
              <action>ALWAYS log</action>
              <action>FALSE recover autohealing</action>
              <action>TRUE servicebooted.sh</action>
            </rule>
            ...
  ...
        </rules>
```

> **Note**
> - During the KPIs or rules update, auto-recovery does not happen as the monitors are unset. Auto-recovery happens when the monitors are reset in the deployment.
> - The *event_name* cannot be modified during an update. It can only be added or deleted.

For more information on KPIs and Rules, see the KPIs and Rules Section.

Updating the Number of VMs in a Deployment (Updating Manual Scale In/ Scale Out)

You can add and remove VMs from an existing deployment by changing the min_active and max_active values in the scaling section of the datamodel. This alters the size of the initial deployment.

In the example below, the deployment has an initial count of 2 VMs, which can scale out to 5 VMs.

```
<esc_datamodel xmlns:ns2="urn:ietf:params:xml:ns:netconf:notification:1.0"
xmlns:ns1="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns:ns3="http://www.cisco.com/esc/esc_notifications"
xmlns:ns0="http://www.cisco.com/esc/esc" xmlns="http://www.cisco.com/esc/esc">
  <version>1.0.0</version>
    . . .
    <vm_group>
      </interfaces>
        <interface>
          <network>1fbf9fc2-3074-4ae6-bb0a-09d526fbada6</network>
          <nicid>1</nicid>
          <ip_address>10.0.0.0</ip_address>
        </interface>
      </interfaces>
      <scaling>
        <min_active>2</min_active>
```

```
                            <max_active>5</max_active>
                            <elastic>true</elastic>


                            . . .
```

The example below creates an additional 8 VMs bringing the number of active VMs up to a minimum of 10. See the table below for more scenarios.

```
<esc_datamodel xmlns:ns2="urn:ietf:params:xml:ns:netconf:notification:1.0"
xmlns:ns1="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns:ns3="http://www.cisco.com/esc/esc_notifications"
xmlns:ns0="http://www.cisco.com/esc/esc" xmlns="http://www.cisco.com/esc/esc">
  <version>1.0.0</version>
     . . .
     <vm_group>
        </interfaces>
          <interface>
            <network>1fbf9fc2-3074-4ae6-bb0a-09d526fbada6</network>
            <nicid>1</nicid>
            <ip_address>10.0.0.0</ip_address>
          </interface>
        </interfaces>
       <scaling>
          <min_active>10</min_active>
          <max_active>15</max_active>
          <elastic>true</elastic>
          <static_ip_address_pool>
            <network>1fbf9fc2-3074-4ae6-bb0a-09d526fbada6</network>
            <gateway>192.168.0.1</gateway> <!-- not used -->
            <netmask>255.255.255.0</netmask> <!-- not used -->
            <ip_address>10.0.0.0</ip_address>
          </static_ip_address_pool>
       </scaling>
```

The table below shows some more scenarios on updating the minimum and maximum values in the scaling section.

Table 2: Updating the Number of VMs in a Deployment

Scenario	Old Value	New Value	Active Value
If the initial number of VMs are a minimum of 2 and maximum of 5 in the scaling section, updating the minimum number of VMs to 3 would create one additional VM. This assumes that the active number of VMs remains at 2.	The old minimum number of VMs is 2.	The new minimum number of VMs is 3.	The active number of VMs is 2.

Scenario	Old Value	New Value	Active Value
If the initial number of VMs is a minimum value of 2 and maximum value of 5, then updating the minimum value to 3 would update the database but will not impact the deployment. This scenario will occur if the original deployment has scaled creating one additional VM.	The old minimum value is 2.	The new minimum value is 3.	The active count is 3.
If the initial number of VMs is a minimum of 2 and maximum of 5, then updating the minimum value to 1 will update the database but will not impact the deployment. Having an active number of VMs greater than the minimum value is a valid deployment as the number of active VMs falls within the minimum or maximum range.	The old minimum value is 2.	The new minimum value is 1.	The active number of VMs is 2.
If the initial number of VMs is a minimum of 2 and maximum of 5, then updating the maximum to 6 will update the database but will not impact the deployment. Having an active number of VMs lesser than the maximum value is a valid deployment as the number of active VMs falls within the minimum or maximum range.	The old maximum value is 5.	The new maximum value is 6.	The active number of VMs is 2.

Scenario	Old Value	New Value	Active Value
If the initial number of VMs is a minimum of 2 and maximum of 5, then updating the maximum value to 4 will update the database but will not have any impact on the deployment. Having an active VM count lesser than the maximum value is a valid deployment as the number of active VMs falls within the minimum or maximum range.	The old maximum value is 5.	The new maximum value is 4.	The active number of VMs is 2.
If the initial number of VMs is a minimum of 2 and maximum of 5, then updating the maximum number of VMs to 4 will update the database and remove one VM from the deployment. The last VM created will be removed bringing the active and maximum count down to 4.	The old maximum value is 5.	The new maximum value is 4.	The active number of VMs is 4.

If static IPs are used, adding more VMs to a deployment needs update to the scaling pool section.

The deployment datamodel is as follows:

```
<esc_datamodel xmlns:ns2="urn:ietf:params:xml:ns:netconf:notification:1.0"
xmlns:ns1="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns:ns3="http://www.cisco.com/esc/esc_notifications"
xmlns:ns0="http://www.cisco.com/esc/esc" xmlns="http://www.cisco.com/esc/esc">
  <version>1.0.0</version>
      . . .
    <vm_group>
      </interfaces>
        <interface>
          <network>1fbf9fc2-3074-4ae6-bb0a-09d526fbada6</network>
          <nicid>1</nicid>
          <ip_address>23.23.23.23</ip_address>
        </interface>
      </interfaces>
      <scaling>
        <min_active>1</min_active>
        <max_active>1</max_active>
        <elastic>true</elastic>
        <static_ip_address_pool>
          <network>1fbf9fc2-3074-4ae6-bb0a-09d526fbada6</network>
          <gateway>192.168.0.1</gateway> <!- not used ->
          <netmask>255.255.255.0</netmask> <!- not used ->
          <ip_address>23.23.23.23</ip_address>
```

```
                    </static_ip_address_pool>
                </scaling>
```

Pools are linked to interfaces through network id. The updated datamodel is as follows:

```
Update payload
<esc_datamodel xmlns:ns2="urn:ietf:params:xml:ns:netconf:notification:1.0"
xmlns:ns1="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns:ns3="http://www.cisco.com/esc/esc_notifications"
xmlns:ns0="http://www.cisco.com/esc/esc" xmlns="http://www.cisco.com/esc/esc">
  <version>1.0.0</version>
      . . .
    <vm_group>
        <interfaces>
          <interface>
            <network>1fbf9fc2-3074-4ae6-bb0a-09d526fbada6</network>
            <nicid>1</nicid>
            <ip_address>23.23.23.23</ip_address>
          </interface>
        </interfaces>
        <scaling>
          <min_active>2</min_active>
          <max_active>2</max_active>
          <elastic>true</elastic>
          <static_ip_address_pool>
              <network>1fbf9fc2-3074-4ae6-bb0a-09d526fbada6</network>
              <gateway>192.168.0.1</gateway>
              <netmask>255.255.255.0</netmask>
              <ip_address>10.0.0.0</ip_address>
              <ip_address>10.0.0.24</ip_address>
          </static_ip_address_pool>
        </scaling>
```

The first IP is also included in the update datamodel. If a value is not present in the update list it will be removed from the pool. This results in creating a single VM using the IP address 10.0.0.24.

Note   You cannot remove a specific VM from the deployment.

Updating the Recovery Wait Time

You can now update the recovery wait time in an existing deployment. In the example below, the <recovery_wait_time> parameter is set to 60 seconds during the initial deployment.

```
<vm_group>
 <name>CSR</name>
 <recovery_wait_time>60</recovery_wait_time>
```

The recovery wait time is updated to 100 seconds in the existing deployment.

```
<vm_group>
 <name>CSR</name>
 <recovery_wait_time>100</recovery_wait_time>
```

Updating the recovery wait time impacts the VMs created in the existing deployment.

After receiving a VM_DOWN event, recovery wait time allows ESC to wait for a certain amount of time before proceeding with the VM recovery workflow. The time allocated for recovery wait time allows the VM to restore network connectivity or heal itself. If a VM_ALIVE is triggered within this time, VM recovery is canceled.

Updating the Recovery Policy

You can add the recovery policy, or update the existing recovery policy parameters while updating a deployment.

Auto recovery is triggered automatically without notification. For manual recovery, the VM_MANUAL_RECOVERY_NEEDED notification is sent, and the recovery starts only if the user sends command.

When the recovery type is set to auto, the recovery starts automatically without notification. When the recovery type is set to manual, the VM_MANUAL_RECOVERY_NEEDED notification is sent, and the recovery starts only if the user sends command.

In the example below, the recovery action is set to REBOOT_THEN_REDEPLOY during initial deployment. It is updated to REBOOT_ONLY during the deployment update. If the recovery is not successful, the maximum number of retries is 1 in the initial deployment. You can update the maximum retries as well in an existing deployment. In the example below, the maximum number of retries is updated to 3.

Initial Deployment

```
<recovery_policy>
          <action_on_recovery>REBOOT_THEN_REDEPLOY</action_on_recovery>
            <max_retries>1</max_retries>
        </recovery_policy>
```

Deployment Update

```
<recovery_policy>
          <action_on_recovery>REBOOT_ONLY</action_on_recovery>
             <max_retries>3</max_retries>
        </recovery_policy>
```

The recovery policy notification is as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
  <eventTime>2017-06-21T12:35:12.354+00:00</eventTime>
  <escEvent xmlns="http://www.cisco.com/esc/esc">
    <status>SUCCESS</status>
    <status_code>200</status_code>
    <status_message>Service group update completed successfully</status_message>
    <depname>jenkins-update-recovery-success-dep-201102</depname>
    <tenant>jenkins-update-recovery-success-tenant-201102</tenant>
    <tenant_id>11ade63bac8a4010a969df0d0b91b9bf</tenant_id>
    <depid>574b2e11-61a9-4d9b-83b1-e95a3aa56fdd</depid>
    <event>
      <type>SERVICE_UPDATED</type>
    </event>
  </escEvent>
</notification>
```

During the deployment update, a recovery policy cannot be overwritten with LCS. For example, a recovery policy with REBOOT_ONLY cannot be overwritten with lifecycle stage (LCS).

Updating an Image

You can update the image reference of VMs in an existing deployment.

The datamodel update is as follows:

Existing datamodel:

```
<recovery_wait_time>30</recovery_wait_time>
```

```
<flavor>Automation-Cirros-Flavor</flavor>
<image>Automation-Cirros-Image</image>
```

New datamodel:

```
<recovery_wait_time>30</recovery_wait_time>
<flavor>Automation-Cirros-Flavor</flavor>
<image>Automation-CSR-Image-3_14</image>
```

You receive a service update notification after the image is updated.

```
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
<eventTime>2018-05-10T17:34:00.605+00:00</eventTime>
<escEvent xmlns="http://www.cisco.com/esc/esc">
<status>SUCCESS</status>
<status_code>200</status_code>
<status_message>Service group update completed successfully</status_message>
<depname>ud-A</depname>
<tenant>ut-AM</tenant>
<tenant_id>24e21e581ad441ebbb3bd22e69c36322</tenant_id>
<depid>e009b1cc-0aa9-4abd-8aac-265be7f9a80d</depid>
<event>
<type>SERVICE_UPDATED</type>
</event>
</escEvent>
</notification>
```

The new image reference appears in the opdata:

```
<vm_group>
<name>ug-1</name>
<flavor>m1.large</flavor>
<image>cirror</image>
<vm_instance>
<vm_id>9a63afed-c70f-4827-91e2-72bdd86c5e39</vm_id>
```

If an incorrect image name is provided, then the following error appears:

```
<?xml version="1.0" encoding="UTF-8"?>
<notification xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">
<eventTime>2018-05-08T19:28:12.321+00:00</eventTime>
<escEvent xmlns="http://www.cisco.com/esc/esc">
<status>FAILURE</status>
<status_code>500</status_code>
<status_message>Error during service update: Failed to [Update] deployment: The image
Automation-1-Cirros-Image cannot be found on the virtual infrastructure
manager.</status_message>
<depname>ud-A</depname>
<tenant>ut-AL</tenant>
<tenant_id>4fb19d82c5b34b33aa6162c0b33f07d7</tenant_id>
<depid>6eed6eba-4f3f-401d-83be-91d703ee4946</depid>
<event>
<type>SERVICE_UPDATED</type>
</event>
</escEvent>
</notification>
```

Rollback scenarios for Image Update

You must update the image reference even when the service is in error state so that the image reference gets updated in the subsequent update. The table below lists the image update rollback conditions, the expected behavior and notifications.

Rollback condition	Expected behavior	Notification

The service is in the ERROR state, and the request has image update only	The image is updated but the service remains in the ERROR state	`?xml version="1.0" encoding="UTF-8"?>`
		`<notification`
		`xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">`
		`<eventTime>2018-06-06T13:59:04.331+00:00</eventTime>`
		`<escEvent xmlns="http://www.cisco.com/esc/esc">`
		`<status>SUCCESS</status>`
		`<status_code>200</status_code>`
		`<status_message>Deployment update successful. But one or more VMs are still in ERROR state.</status_message>`
		`<depname>ud-A</depname>`
		`<tenant>ut-JJ</tenant>`
		`<tenant_id>0dbb67d6457642f68520565ce785976a</tenant_id>`
		`<depid>0feea6bc-310c-49c8-8416-94f89a324bfb</depid>`
		`<event>`
		`<type>SERVICE_UPDATED</type>`
		`</event>`
		`</escEvent>`
		`</notification>`

Service is in ERROR state and the request is sent to remove the VM group (in error)	The VM group is removed and the service is in ACTIVE state	
The service is in ERROR state. A request to remove the VM group (in error) is sent along with an image update request in the same VM group	The VM group should be removed. There is no impact due to the image update. The service is back to ACTIVE state	

Rollback condition	Expected behavior	Notification

The service is in ERROR state. A request to remove the VM groups (in active) is sent along with the image update in a different VM group (in error)	The VM group (in active) is removed. The image updated in the vm group (in error). the service remains in the ERROR state.	`?xml version="1.0" encoding="UTF-8"?>`
		`<notification`
		`xmlns="urn:ietf:params:xml:ns:netconf:notification:1.0">`
		`<eventTime>2018-06-06T13:59:04.331+00:00</eventTime>`
		`<escEvent xmlns="http://www.cisco.com/esc/esc">`
		`<status>SUCCESS</status>`
		`<status_code>200</status_code>`
		`<status_message>Deployment update successful. But one or more VMs are still in ERROR state.</status_message>`
		`<depname>ud-A</depname>`
		`<tenant>ut-JJ</tenant>`
		`<tenant_id>0dbb67d6457642f68520565ce785976a</tenant_id>`
		`<depid>0feea6bc-310c-49c8-8416-94f89a324bfb</depid>`
		`<event>`
		`<type>SERVICE_UPDATED</type>`
		`</event>`
		`</escEvent>`
		`</notification>`

The service is in the ERROR state. A single VM group is present (in error). The image update request is sent.	The image is updated but the service remains in the ERROR state. The VM group (in error) cannot be removed, as it is the only one in the service. User must undeploy and redeploy.	

Adding a VM Group (vCloud Director)

ESC supports only addition and deletion of VM group(s) in vCD. One or multiple VM group(s) can be added or deleted in a service update.

```
<?xml version="1.0" encoding="UTF-8"?>
<esc_datamodel xmlns="http://www.cisco.com/esc/esc" xmlns:ns0="http://www.cisco.com/esc/esc"
 xmlns:ns1="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns:ns2="urn:ietf:params:xml:ns:netconf:notification:1.0"
xmlns:ns3="http://www.cisco.com/esc/esc_notifications">
  <tenants>
    <tenant>
```

```xml
<!-- ESC scope tenant -->
<name>vnf-dep</name>
<vim_mapping>false</vim_mapping>
<deployments>
  <deployment>
    <!-- vApp instance name -->
    <name>dep</name>
    <policies>
      <placement_group>
        <name>placement-affinity-1</name>
        <type>affinity</type>
        <enforcement>strict</enforcement>
        <vm_group>g1</vm_group>
        <vm_group>g2</vm_group>
        <vm_group>g3</vm_group>
      </placement_group>
    </policies>
    <extensions>
      <extension>
        <name>VMWARE_VCD_PARAMS</name>
        <properties>
          <property>
            <name>CATALOG_NAME</name>
            <value>catalog-1</value>
          </property>
          <property>
            <name>VAPP_TEMPLATE_NAME</name>
            <value>uLinux_vApp_Template</value>
          </property>
        </properties>
      </extension>
    </extensions>
    <vm_group>
      <name>g1</name>
      <locator>
        <!-- vCD vim connector id -->
        <vim_id>vcd</vim_id>
        <!-- vCD orgnization -->
        <vim_project>esc</vim_project>
        <!-- vDC name -->
        <vim_vdc>VDC-1</vim_vdc>
      </locator>
      <!-- VM name in vAppTemplate -->
      <image>vm-001</image>
      <bootup_time>120</bootup_time>
      <recovery_wait_time>5</recovery_wait_time>
      <interfaces>
        <interface>
          <nicid>0</nicid>
          <network>MgtNetwork</network>
          <ip_address>10.0.0.155</ip_address>
          <mac_address>00:1C:B3:09:85:15</mac_address>
        </interface>
      </interfaces>
      <scaling>
        <min_active>1</min_active>
        <max_active>1</max_active>
        <elastic>true</elastic>
        <static_ip_address_pool>
          <network>MgtNetwork</network>
          <ip_address>10.0.0.155</ip_address>
        </static_ip_address_pool>
        <static_mac_address_pool>
          <network>MgtNetwork</network>
```

```
                        <mac_address>00:1C:B3:09:85:15</mac_address>
                      </static_mac_address_pool>
                  </scaling>
                  <kpi_data>
                    <kpi>
                      <event_name>VM_ALIVE</event_name>
                      <metric_value>1</metric_value>
                      <metric_cond>GT</metric_cond>
                      <metric_type>UINT32</metric_type>
                      <metric_collector>
                        <type>ICMPPing</type>
                        <nicid>0</nicid>
                        <poll_frequency>30</poll_frequency>
                        <polling_unit>seconds</polling_unit>
                        <continuous_alarm>false</continuous_alarm>
                      </metric_collector>
                    </kpi>
                  </kpi_data>
                  <rules>
                    <admin_rules>
                      <rule>
                        <event_name>VM_ALIVE</event_name>
                        <action>"ALWAYS log"</action>
                        <action>"TRUE servicebooted.sh"</action>
                        <action>"FALSE recover autohealing"</action>
                      </rule>
                    </admin_rules>
                  </rules>
                  <config_data>
                    <configuration>
                      <dst>ovfProperty:mgmt-ipv4-addr</dst>
                      <data>$NICID_0_IP_ADDRESS/24</data>
                    </configuration>
                  </config_data>
                  <recovery_policy>
                    <action_on_recovery>REBOOT_ONLY</action_on_recovery>
                  </recovery_policy>
              </vm_group>
              <vm_group>
                  <name>g2</name>
                  <locator>
                    <!-- vCD vim connector id -->
                    <vim_id>vcd</vim_id>
                    <!-- vCD orgnization -->
                    <vim_project>esc</vim_project>
                    <!-- vDC name -->
                    <vim_vdc>VDC-1</vim_vdc>
                  </locator>
                  <!-- VM name in vAppTemplate -->
                  <image>vm-002</image>
                  <bootup_time>120</bootup_time>
                  <recovery_wait_time>5</recovery_wait_time>
                  <interfaces>
                    <interface>
                      <nicid>0</nicid>
                      <network>MgtNetwork</network>
                      <ip_address>10.0.0.156</ip_address>
                      <mac_address>00:1C:B3:09:85:16</mac_address>
                    </interface>
                  </interfaces>
                  <scaling>
                    <min_active>1</min_active>
                    <max_active>1</max_active>
                    <elastic>true</elastic>
```

```xml
                    <static_ip_address_pool>
                      <network>MgtNetwork</network>
                      <ip_address>10.0.0.156</ip_address>
                    </static_ip_address_pool>
                    <static_mac_address_pool>
                      <network>MgtNetwork</network>
                      <mac_address>00:1C:B3:09:85:16</mac_address>
                    </static_mac_address_pool>
                  </scaling>
                  <kpi_data>
                    <kpi>
                      <event_name>VM_ALIVE</event_name>
                      <metric_value>1</metric_value>
                      <metric_cond>GT</metric_cond>
                      <metric_type>UINT32</metric_type>
                      <metric_collector>
                        <type>ICMPPing</type>
                        <nicid>0</nicid>
                        <poll_frequency>30</poll_frequency>
                        <polling_unit>seconds</polling_unit>
                        <continuous_alarm>false</continuous_alarm>
                      </metric_collector>
                    </kpi>
                  </kpi_data>
                  <rules>
                    <admin_rules>
                      <rule>
                        <event_name>VM_ALIVE</event_name>
                        <action>"ALWAYS log"</action>
                        <action>"TRUE servicebooted.sh"</action>
                        <action>"FALSE recover autohealing"</action>
                      </rule>
                    </admin_rules>
                  </rules>
                  <config_data>
                    <configuration>
                      <dst>ovfProperty:mgmt-ipv4-addr</dst>
                      <data>$NICID_0_IP_ADDRESS/24</data>
                    </configuration>
                  </config_data>
                  <recovery_policy>
                    <action_on_recovery>REBOOT_ONLY</action_on_recovery>
                  </recovery_policy>
              </vm_group>
              <vm_group>
                  <name>g3</name>
                  <locator>
                    <!-- vCD vim connector id -->
                    <vim_id>vcd</vim_id>
                    <!-- vCD orgnization -->
                    <vim_project>esc</vim_project>
                    <!-- vDC name -->
                    <vim_vdc>VDC-1</vim_vdc>
                  </locator>
                  <!-- VM name in vAppTemplate -->
                  <image>vm-002</image>
                  <bootup_time>120</bootup_time>
                  <recovery_wait_time>5</recovery_wait_time>
                  <interfaces>
                    <interface>
                      <nicid>0</nicid>
                      <network>MgtNetwork</network>
                      <ip_address>20.0.0.157</ip_address>
                      <mac_address>00:1C:B3:09:85:17</mac_address>
```

```
                        </interface>
                    </interfaces>
                    <scaling>
                      <min_active>1</min_active>
                      <max_active>1</max_active>
                      <elastic>true</elastic>
                      <static_ip_address_pool>
                        <network>MgtNetwork</network>
                        <ip_address>10.0.0.157</ip_address>
                      </static_ip_address_pool>
                      <static_mac_address_pool>
                        <network>MgtNetwork</network>
                        <mac_address>00:1C:B3:09:85:17</mac_address>
                      </static_mac_address_pool>
                    </scaling>
                    <kpi_data>
                      <kpi>
                        <event_name>VM_ALIVE</event_name>
                        <metric_value>1</metric_value>
                        <metric_cond>GT</metric_cond>
                        <metric_type>UINT32</metric_type>
                        <metric_collector>
                          <type>ICMPPing</type>
                          <nicid>0</nicid>
                          <poll_frequency>30</poll_frequency>
                          <polling_unit>seconds</polling_unit>
                          <continuous_alarm>false</continuous_alarm>
                        </metric_collector>
                      </kpi>
                    </kpi_data>
                    <rules>
                      <admin_rules>
                        <rule>
                          <event_name>VM_ALIVE</event_name>
                          <action>"ALWAYS log"</action>
                          <action>"TRUE servicebooted.sh"</action>
                          <action>"FALSE recover autohealing"</action>
                        </rule>
                      </admin_rules>
                    </rules>
                    <config_data>
                      <configuration>
                        <dst>ovfProperty:mgmt-ipv4-addr</dst>
                        <data>$NICID_0_IP_ADDRESS/24</data>
                      </configuration>
                    </config_data>
                    <recovery_policy>
                      <action_on_recovery>REBOOT_ONLY</action_on_recovery>
                    </recovery_policy>
                  </vm_group>
              </deployment>
            </deployments>
          </tenant>
       </tenants>
</esc_datamodel>
```

Deleting a VM Group (vCloud Director)

ESC allows deleting a VM group in vCloud Director:

```
<?xml version="1.0" encoding="UTF-8"?>
<esc_datamodel xmlns="http://www.cisco.com/esc/esc" xmlns:nc="http://www.cisco.com/esc/esc"
 xmlns:ns0="http://www.cisco.com/esc/esc" xmlns:ns1="urn:ietf:params:xml:ns:netconf:base:1.0"
 xmlns:ns2="urn:ietf:params:xml:ns:netconf:notification:1.0"
```

```xml
               xmlns:ns3="http://www.cisco.com/esc/esc_notifications">
    <tenants>
      <tenant>
        <!-- ESC scope tenant -->
        <name>vnf-dep</name>
        <vim_mapping>false</vim_mapping>
        <deployments>
          <deployment>
            <!-- vApp instance name -->
            <name>dep</name>
            <policies>
              <placement_group>
                <name>placement-affinity-1</name>
                <type>affinity</type>
                <enforcement>strict</enforcement>
                <vm_group>g1</vm_group>
                <vm_group>g2</vm_group>
                <vm_group nc:operation="delete">g3</vm_group>
              </placement_group>
            </policies>
            <extensions>
              <extension>
                <name>VMWARE_VCD_PARAMS</name>
                <properties>
                  <property>
                    <name>CATALOG_NAME</name>
                    <value>catalog-1</value>
                  </property>
                  <property>
                    <name>VAPP_TEMPLATE_NAME</name>
                    <value>uLinux_vApp_Template</value>
                  </property>
                </properties>
              </extension>
            </extensions>
            <vm_group>
              <name>g1</name>
              <locator>
                <!-- vCD vim connector id -->
                <vim_id>vcd</vim_id>
                <!-- vCD orgnization -->
                <vim_project>esc</vim_project>
                <!-- vDC name -->
                <vim_vdc>VDC-1</vim_vdc>
              </locator>
              <!-- VM name in vAppTemplate -->
              <image>vm-001</image>
              <bootup_time>120</bootup_time>
              <recovery_wait_time>5</recovery_wait_time>
              <interfaces>
                <interface>
                  <nicid>0</nicid>
                  <network>MgtNetwork</network>
                  <ip_address>10.0.0.155</ip_address>
                  <mac_address>00:1C:B3:09:85:15</mac_address>
                </interface>
              </interfaces>
              <scaling>
                <min_active>1</min_active>
                <max_active>1</max_active>
                <elastic>true</elastic>
                <static_ip_address_pool>
                  <network>MgtNetwork</network>
                  <ip_address>10.0.0.155</ip_address>
```

```
            </static_ip_address_pool>
            <static_mac_address_pool>
              <network>MgtNetwork</network>
              <mac_address>00:1C:B3:09:85:15</mac_address>
            </static_mac_address_pool>
          </scaling>
          <kpi_data>
            <kpi>
              <event_name>VM_ALIVE</event_name>
              <metric_value>1</metric_value>
              <metric_cond>GT</metric_cond>
              <metric_type>UINT32</metric_type>
              <metric_collector>
                <type>ICMPPing</type>
                <nicid>0</nicid>
                <poll_frequency>30</poll_frequency>
                <polling_unit>seconds</polling_unit>
                <continuous_alarm>false</continuous_alarm>
              </metric_collector>
            </kpi>
          </kpi_data>
          <rules>
            <admin_rules>
              <rule>
                <event_name>VM_ALIVE</event_name>
                <action>"ALWAYS log"</action>
                <action>"TRUE servicebooted.sh"</action>
                <action>"FALSE recover autohealing"</action>
              </rule>
            </admin_rules>
          </rules>
          <config_data>
            <configuration>
              <dst>ovfProperty:mgmt-ipv4-addr</dst>
              <data>$NICID_0_IP_ADDRESS/24</data>
            </configuration>
          </config_data>
          <recovery_policy>
            <action_on_recovery>REBOOT_ONLY</action_on_recovery>
          </recovery_policy>
        </vm_group>
        <vm_group>
          <name>g2</name>
          <locator>
            <!-- vCD vim connector id -->
            <vim_id>vcd</vim_id>
            <!-- vCD orgnization -->
            <vim_project>esc</vim_project>
            <!-- vDC name -->
            <vim_vdc>VDC-1</vim_vdc>
          </locator>
          <!-- VM name in vAppTemplate -->
          <image>vm-002</image>
          <bootup_time>120</bootup_time>
          <recovery_wait_time>5</recovery_wait_time>
          <interfaces>
            <interface>
              <nicid>0</nicid>
              <network>MgtNetwork</network>
              <ip_address>10.0.0.156</ip_address>
              <mac_address>00:1C:B3:09:85:16</mac_address>
            </interface>
          </interfaces>
          <scaling>
```

```
                        <min_active>1</min_active>
                        <max_active>1</max_active>
                        <elastic>true</elastic>
                        <static_ip_address_pool>
                          <network>MgtNetwork</network>
                          <ip_address>10.0.0.156</ip_address>
                        </static_ip_address_pool>
                        <static_mac_address_pool>
                          <network>MgtNetwork</network>
                          <mac_address>00:1C:B3:09:85:16</mac_address>
                        </static_mac_address_pool>
                    </scaling>
                    <kpi_data>
                      <kpi>
                        <event_name>VM_ALIVE</event_name>
                        <metric_value>1</metric_value>
                        <metric_cond>GT</metric_cond>
                        <metric_type>UINT32</metric_type>
                        <metric_collector>
                          <type>ICMPPing</type>
                          <nicid>0</nicid>
                          <poll_frequency>30</poll_frequency>
                          <polling_unit>seconds</polling_unit>
                          <continuous_alarm>false</continuous_alarm>
                        </metric_collector>
                      </kpi>
                    </kpi_data>
                    <rules>
                      <admin_rules>
                        <rule>
                          <event_name>VM_ALIVE</event_name>
                          <action>"ALWAYS log"</action>
                          <action>"TRUE servicebooted.sh"</action>
                          <action>"FALSE recover autohealing"</action>
                        </rule>
                      </admin_rules>
                    </rules>
                    <config_data>
                      <configuration>
                        <dst>ovfProperty:mgmt-ipv4-addr</dst>
                        <data>$NICID_0_IP_ADDRESS/24</data>
                      </configuration>
                    </config_data>
                    <recovery_policy>
                      <action_on_recovery>REBOOT_ONLY</action_on_recovery>
                    </recovery_policy>
                </vm_group>
                <vm_group nc:operation="delete">
                  <name>g3</name>
                  <locator>
                    <!-- vCD vim connector id -->
                    <vim_id>vcd</vim_id>
                    <!-- vCD orgnization -->
                    <vim_project>esc</vim_project>
                    <!-- vDC name -->
                    <vim_vdc>VDC-1</vim_vdc>
                  </locator>
                  <!-- VM name in vAppTemplate -->
                  <image>vm-002</image>
                  <bootup_time>120</bootup_time>
                  <recovery_wait_time>5</recovery_wait_time>
                  <interfaces>
                    <interface>
                      <nicid>0</nicid>
```

```
                                 <network>MgtNetwork</network>
                                 <ip_address>10.0.0.157</ip_address>
                                 <mac_address>00:1C:B3:09:85:17</mac_address>
                              </interface>
                           </interfaces>
                           <scaling>
                              <min_active>1</min_active>
                              <max_active>1</max_active>
                              <elastic>true</elastic>
                              <static_ip_address_pool>
                                 <network>MgtNetwork</network>
                                 <ip_address>10.0.0.157</ip_address>
                              </static_ip_address_pool>
                              <static_mac_address_pool>
                                 <network>MgtNetwork</network>
                                 <mac_address>00:1C:B3:09:85:17</mac_address>
                              </static_mac_address_pool>
                           </scaling>
                           <kpi_data>
                              <kpi>
                                 <event_name>VM_ALIVE</event_name>
                                 <metric_value>1</metric_value>
                                 <metric_cond>GT</metric_cond>
                                 <metric_type>UINT32</metric_type>
                                 <metric_collector>
                                    <type>ICMPPing</type>
                                    <nicid>0</nicid>
                                    <poll_frequency>30</poll_frequency>
                                    <polling_unit>seconds</polling_unit>
                                    <continuous_alarm>false</continuous_alarm>
                                 </metric_collector>
                              </kpi>
                           </kpi_data>
                           <rules>
                              <admin_rules>
                                 <rule>
                                    <event_name>VM_ALIVE</event_name>
                                    <action>"ALWAYS log"</action>
                                    <action>"TRUE servicebooted.sh"</action>
                                    <action>"FALSE recover autohealing"</action>
                                 </rule>
                              </admin_rules>
                           </rules>
                           <config_data>
                              <configuration>
                                 <dst>ovfProperty:mgmt-ipv4-addr</dst>
                                 <data>$NICID_0_IP_ADDRESS/24</data>
                              </configuration>
                           </config_data>
                           <recovery_policy>
                              <action_on_recovery>REBOOT_ONLY</action_on_recovery>
                           </recovery_policy>
                        </vm_group>
                     </deployment>
                  </deployments>
               </tenant>
            </tenants>
         </esc_datamodel>
```