



Deployment States and Events

ESC deployment lifecycle is represented using various states. The datamodel defines various states the service and VNF will be in during the deployment lifecycle. In general, the deployment or service life cycle is represented in two stages. The service contains one or more different type of vm groups. The vm group represents a group of same type of VM or VNF. After receiving a deployment or service request, ESC validates the request and accepts the request for processing. During processing, ESC deploys the VM or VNF in the underlying VIM using the resources defined in the data model. ESC monitors these VM/VNF based on the kpi and actions defined. As defined by configured policies and actions, ESC triggers auto healing, scale in, scale out and other workflows.

During deployment or any other workflow, the service or deployment's state and VM or VNF state changes and events are sent. The state and events play a key role in identifying the status of the deployment. The current state of the deployment is represented in the operational data. ESC sends the notifications or events when a deployment, or VM or VNF state change that needs to be notified. In the datamodel all the different states and events are defined.

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Deployment or Service States

The service state represents the state of the full service or deployment. The state of the service also depends on the various VM or VNF states, state of the VM in the vm groups, and the current workflow that is running on the service or the VM or VNF. The service or deployment state is an aggregate summary of the whole deployment.

Table 1: Deployment or Service States

| Service State | Description |
|-------------------------|--|
| SERVICE_UNDEF_STATE | The initial service state. Service will be in this state until ESC starts processing the deployment. |
| SERVICE_DEPLOYING_STATE | In this state, VMs are being deployed for this service or deployment. |
| SERVICE_INERT_STATE | In this state, VMs under this deployment are deployed but are still not active or booted up. |

| Service State | Description |
|---------------------------|--|
| SERVICE_ACTIVE_STATE | In this state, all the VMs under this deployment are deployed and alive. |
| SERVICE_ERROR_STATE | Service will be in this state if any error happened during the deployment, recovery, scale in or scale out, or any other workflow. |
| SERVICE_UNDEPLOYING_STATE | In this state, VM are being undeployed for this service or deployment. |
| SERVICE_STOPPING_STATE | In this state, the VM or VNF under the service are being stopped due to service action request. |
| SERVICE_STOPPED_STATE | In this state, the VM or VNF under the service are stopped due to service action request. |
| SERVICE_STARTING_STATE | In this state, the VM or VNF under the service are starting due to service action request. |
| SERVICE_REBOOTING_STATE | In this state, the VM or VNF under the service are being rebooted due to service action request. |

VM or VNF States

The VM or VNF state represents the state of the particular VM or VNF in the service or deployment. The VM state is key to identify the current state of a particular VNF and the workflows that are running on this VM or VNF.

Table 2: VM or VNF States

| VM State | Description |
|---------------------------|--|
| VM_UNDEF_STATE | The initial state of VM or VNF before deployment of this VM. |
| VM_DEPLOYING_STATE | VM or VNF is being deployed on to the VIM. |
| VM_MONITOR_UNSET_STATE | VM or VNF is deployed in the VIM but the monitoring rules are not applied. |
| VM_MONITOR_DISABLED_STATE | Due to a VM action request or recovery workflow, the monitoring or kpi rules applied on the VM or VNFs were not enabled. |
| VM_STOPPING_STATE | VM or VNF is being stopped. |
| VM_SHUTOFF_STATE | VM or VNF is in stopped or shutoff state. |
| VM_STARTING_STATE | VM or VNF is being started. |
| VM_REBOOTING_STATE | VM or VNF is being rebooted. |

| VM State | Description |
|----------------------|---|
| VM_INERT_STATE | VM or VNF is deployed but not alive. The kpi monitor is applied and waiting for the VM to become alive. |
| VM_ALIVE_STATE | VM or VNF is deployed and successfully booted up or alive as per the monitor or kpi metric. |
| VM_UNDEPLOYING_STATE | VM or VNF is being undeployed or terminated. |
| VM_ERROR_STATE | VM or VNF will be in error state if deployment or any other operation is failed. |

In ESC, the events play a key role in providing the current status of deployment or any other workflow. For more information, see the [Event Notifications or Callback Events](#).

Event Notifications or Callback Events

In ESC, the events play a key role in providing the current status of deployment or any other workflow. In the Netconf Interface, ESC sends notifications and in the REST Interface, ESC sends the callback events. This section describes all the notifications or callback events sent by ESC.

Event Notification or Callback for a Deployment or a VNF

The notifications or callback event type defined below are the event that will be sent to Northbound during the life cycle of a deployment. These events are sent from ESC once the deployment request is received and processing is commenced. ESC sends notification about all stages with the status message that describes the success or failure of the stage.

Table 3: Event Notification or Callback for a Deployment or a VNF

| Event State | Workflow | Description |
|---------------|--------------|---|
| VM_DEPLOYED | Deployment | When a VM or VNF is deployed. Success if VM or VNF deployment is successful or failure. It will be sent per VM or VNF |
| VM_ALIVE | Deployment | When a VM or VNF deployed successfully booted-up or alive as per the monitor\kpi metric. It will be sent per VM or VNF. |
| SERVICE_ALIVE | Deployment | When the deployment or service is complete and all VMs are alive or any of them failed. |
| VM_UNDEPLOYED | Undeployment | When a VM or VNF is undeployed. Success if VM or VNF is successfully undeployed, or Failure. It will be sent per VM or VNF. |

| Event State | Workflow | Description |
|------------------------|-------------------|--|
| SERVICE_UNDEPLOYED | Undeployment | When all the VMs or VNFs are undeployed. Success if all the VMs and resources under the deployment are successfully deleted, or Failure. |
| VM_UPDATED | Deployment Update | In any successful deployment, for each of the VM group details are updated. Success if the update is completed, or Failure. It will be sent per VM\VNF |
| SERVICE_UPDATED | Deployment Update | In any successful deployment, if all of the update is complete. Success if the update is completed, or Failure. |
| SERVICE_UPDATING_STATE | Deployment Update | In this state, some components like, VM, VNF, and data under this deployment gets updated. |
| VM_RECOVERY_INIT | Recovery | The recovery init notification is sent when recovery workflow is triggered |
| VM_RECOVERY_DEPLOYED | Recovery | The recovery deployed notification is sent when the VM or VNF is deployed as part of the recovery workflow. |
| VM_RECOVERY_UNDEPLOYED | Recovery | The recovery undeployed notification is sent when the VM or VNF is undeployed as part of the recovery workflow. |
| VM_RECOVERY_COMPLETE | Recovery | The recovery complete notification is sent when the VM recovery is complete. Success if VM is recovered, else Failure. |
| VM_RECOVERY_REBOOT | Recovery | The recovery reboot notification is sent when the VM or VNF is rebooted as part of recovery. Success if reboot is successful, else Failure. |
| VM_RECOVERY_CANCELLED | Recovery | The recovery canceled notification is sent when a recovery was triggered but before the recovery wait time, VM went to active state. |

| Event State | Workflow | Description |
|----------------------------|-----------------|--|
| VM_MANUAL_RECOVERY_NEEDED | Manual Recovery | The manual recovery needed notification is sent when a recovery is triggered but manual recovery policy is configured. |
| VM_MANUAL_RECOVERY_NO_NEED | Manual Recovery | The manual recovery not needed notification is sent when a recovery is triggered with manual recovery policy configured and the VM becomes active again. |
| VM_SCALE_OUT_INIT | Scale Out | The scale out init notification is sent when a scale out work flow is triggered |
| VM_SCALE_OUT_DEPLOYED | Scale Out | The scale out deployed notification is sent when a VM is deployed as part of scale out. |
| VM_SCALE_OUT_COMPLETE | Scale Out | The scale out completed notification is sent when the scale out workflow is complete. |
| VM_SCALE_IN_INIT | Scale In | The scale in init notification is sent when a scale in workflow is started. |
| VM_SCALE_IN_COMPLETE | Scale In | The scale in completed notification is sent when the scale in workflow is complete. |

Event Notifications or Callback Event Types for Deployment or VNF Operation

The notifications or callback event type defined below are the event that will be sent to Northbound during various operation or action performed by the user. These events are sent from ESC once the action request is received and processing is commenced. ESC sends notification about all stages with the status message that describes the success or failure of the stage.

Table 4: Event Notifications or Callback Event Types for Deployment or VNF Operation

| Event State | Workflow | Description |
|-------------|-----------|---|
| VM_REBOOTED | VM Action | The event is sent when a VM or VNF is rebooted. |
| VM_STOPPED | VM Action | The event is sent when a VM or VNF is stopped. |
| VM_STARTED | VM Action | The event is sent when a VM or VNF is started. |

| Event State | Workflow | Description |
|-----------------------|------------------------|--|
| SERVICE_STOPPED | Deployment Action | The service stopped event is sent when a request to stop all the VM/VNF in a service is completed. |
| SERVICE_STARTED | Deployment Action | The service started event is sent when a request to start all the VM/VNF in a service is completed. |
| SERVICE_REBOOTED | Deployment Action | The service rebooted event is sent when a request to reboot all the VM or VNF in a service is completed. |
| HOST_DISABLE | Host Action / Redeploy | (OpenStack Only) The event is sent when the request to disable the host is completed. |
| HOST_ENABLE | Host Action / Redeploy | (OpenStack Only) The event is sent when the request to enable the host is completed. |
| VIM_OPERATIONAL_STATE | N/A | This event is sent when ESC detects the VIM operational state was changed. |

Event Notifications or Callback Event Types for Resources

The notifications or callback event types defined below are the events that will be sent to northbound during resource creation or deletion. These events are sent from ESC once the request is received and processing is commenced. ESC sends notification about all stages with the status message that describes the success or failure of the stage.

Table 5: Event Notifications or Callback Event Types for Resources

| Event State | Workflow | Description |
|----------------|----------|-----------------|
| CREATE_TENANT | Tenant | Tenant created |
| DELETE_TENANT | Tenant | Tenant deleted |
| CREATE_NETWORK | Network | Network created |
| DELETE_NETWORK | Network | Network deleted |
| CREATE_SUBNET | Subnet | Subnet created |
| DELETE_SUBNET | Subnet | Subnet deleted |
| CREATE_IMAGE | Image | Image created |
| DELETE_IMAGE | Image | Image deleted |
| CREATE_FLAVOR | Flavor | Flavor created |

| Event State | Workflow | Description |
|---------------|----------|----------------|
| DELETE_FLAVOR | Flavor | Flavor deleted |

