

IPWorks VNF Life Cycle Management

User Guide

Copyright

© Ericsson AB 2017, 2018. All rights reserved. No part of this document may be reproduced in any form without the written permission of the copyright owner.

Disclaimer

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing. Ericsson shall have no liability for any error or damage of any kind resulting from the use of this document.

Trademark List

All trademarks mentioned herein are the property of their respective owners. These are shown in the document Trademark Information.



Contents

1	Introduction	1
2	Prerequisites	3
2.1	Hardware and Software	3
3	Onboarding	5
4	Procedures	7
4.1	Instantiate VNF	7
4.2	Scale VNF	11
4.3	Terminate VNF	15
	Reference List	19





1 Introduction

This document describes the system administration tasks performed in the Virtual Network Function Lifecycle Manager (VNF-LCM). The VNF-LCM provides a workflow execution environment and a web-based application for managing VNF life cycle procedures.

VNF life cycle procedures are realized by executing ordered sequences of steps, called workflows. Each workflow must be provided with VNF-specific input parameters during execution.

This document covers the following life cycle management procedures:

- Section 4.1 Instantiate VNF on page 7
- Section 4.2 Scale VNF on page 11
- Section 4.3 Terminate VNF on page 15





2 Prerequisites

This section describes the prerequisites which must be fulfilled before the IPWorks can be installed.

2.1 Hardware and Software

The following hardware (virtual and physical) and software are required:

- The software delivery package including IPWorks workflows and the VNF-LCM scripts is available.
- CEE as Virtual Infrastructure Managers (VIMs) is used.
- VNF-LCM (with version 18.07 or above) is available using either Operations Support System, Radio and Core (OSS-RC) or Ericsson Network Manager (ENM).

If the correct functioning of VNF-LCM must be checked, if, for example, OSS-RC is used, follow the steps defined in the section Post Install in VNF-LCM CEE/Openstack Installation Instructions, Reference [1], in the OSS-RC documentation.

Note: The Virtualized Infrastructure Manager (VIM) connection information in VNF-LCM framework must be configured. This information is used by workflows to connect to VIM and perform operations. Add enough VIMs as needed to VNF-LCM framework, as well as adding enough tenants to the VIM. For detailed information, refer to VNF-Lifecycle Manager System Administration Guide, Reference [2], in the OSS-RC documentation.





3 Onboarding

This section describes how to prepare for workflow-based VNF operations using VNF-LCM.

1. Install IPWorks workflows package.

- a. Log on to VNF-LCM services VM as cloud-user and switch to root user.

```
$ssh cloud-user@<VNF-LCM services VM>
```

```
[cloud-user@vnflaf-services ~]$ su -
```

- b. Install package.

```
[root@vnflaf-services ~]# wfmgr bundle install
--package=/home/cloud-user/<workflow package name>
```

- c. Verify that the installation is successful.

```
[root@vnflaf-services ~]# wfmgr bundle list
```

When IPWorks is installed successfully, its version would be output.
For example:

Name	Version	Package
vIPWorks	2.5.1.1	ERICvIPWorks_CXP9040851-2.5.1.1-1.noarch.rpm

2. Generate SSH key pair.

- a. Check if the key pair id_rsa and id_rsa.pub exist.

```
[root@vnflaf-services ~]# ls /home/jboss_user/.ssh/
```

If exist, skip step b.

- b. Generate SSH key pair.

```
[root@vnflaf-services ~]# su jboss_user
```

```
[jboss_user@vnflaf-services root]$ ssh-keygen -t rsa
```

```
# Generating public/private rsa key pair.
```

```
# Enter file in which to save the key (/home/jboss_user/.ssh/id_rsa):
```

```
# Enter passphrase (empty for no passphrase): [Press enter]
```

```
# Enter same passphrase again: [Press enter]
```

```
Your identification has been saved in /home/jboss_user/.ssh/id_rsa
```

```
Your public key has been saved in /home/jboss_user/.ssh/id_rsa.pub
```



```
[jboss_user@vnflaf-services root]$ exit
```

Note: Encrypted private keys are not supported, that is, keep passphrase empty.



4 Procedures

These sections describe how to perform LCM operations.

Attention!

Do not execute a workflow instance on a VNF while another one is in progress, as it can cause unexpected behavior. Terminate the ongoing procedure before starting a new one.

VNF-LCM procedures utilize workflow instances. Figure 1 shows an example of a workflow instance, where workflow progress can be tracked in the **Workflow Diagram** view. The **Workflow Diagram** only represents stages of the various procedures. Operations that are performed in the **Task** view.

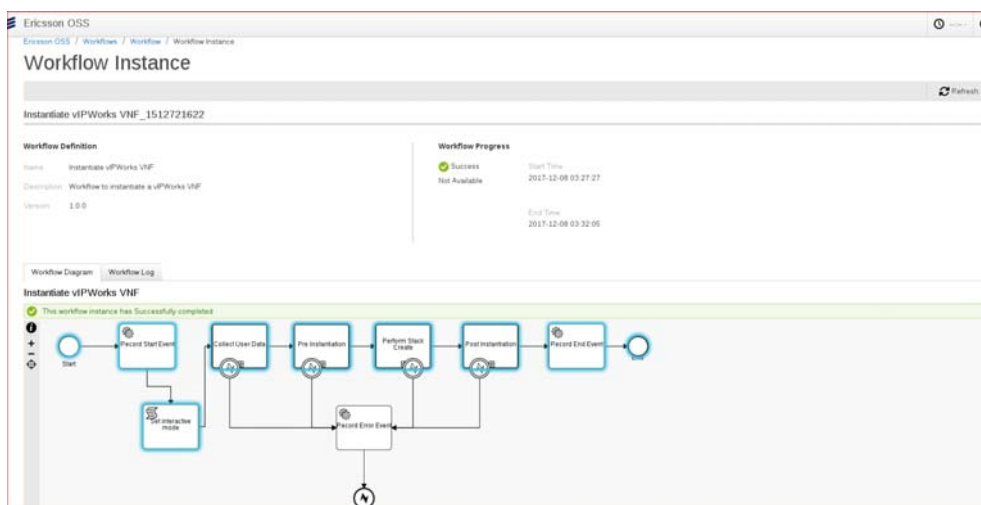


Figure 1 Workflow Instance Overview

4.1 Instantiate VNF

This section describes how to instantiate a VNF using VNF-LCM.

1. Copy the public SSH key into the configuration folder of the VNF instance:

```
[root@vnflaf-services ~]# cp /home/jboss_user/.ssh/id_rsa.pub
/vnflcm-ext/backups/workflows/ipwvnfd/vIPWorks/configurations/
instance1_config/
```

Note: The public key must be added in the configuration directory for each instance.



2. Copy the VNF instance specific HOT template (main.yaml), environment file (env.yaml), and scaling file (ipw_scaling_group.yaml) into the configuration directory of VNF instance:

```
[root@vnflaf-services ~]# cp /home/cloud-user/env.yaml  
/vnflcm-ext/backups/workflows/ipwvnfd/vIPWorks/configurations/  
instance1_config/
```

```
[root@vnflaf-services ~]# cp /home/cloud-user/main.yaml  
/vnflcm-ext/backups/workflows/ipwvnfd/vIPWorks/configurations/  
instance1_config/
```

```
[root@vnflaf-services ~]# cp /home/cloud-user/ipw_scaling_group.  
.yaml /vnflcm-ext/backups/workflows/ipwvnfd/vIPWorks/configurat  
ions/instance1_config/
```

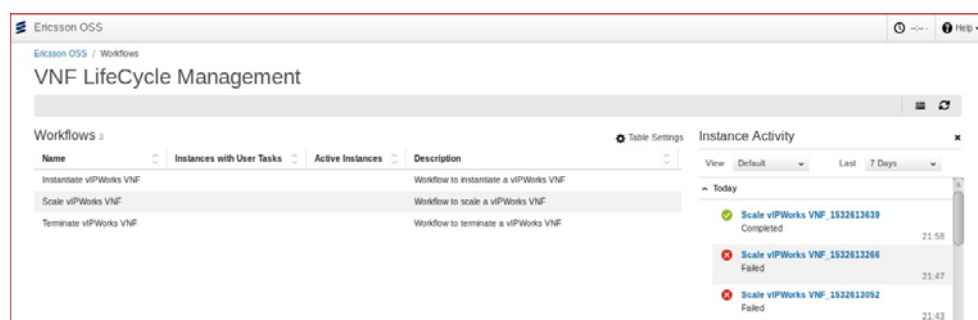
About transferring HOT template and HOT environment files, refer to the related step in IPWorks Deployment Guide, Reference [3].

3. Verify the structure of the /vnflcm-ext/backups/workflows/ipwvnfd/vIPWorks/ directory is as follow:

```
-- vIPWorks  
|-- configurations  
|   |-- instance1_config  
|       |-- main.yaml  
|       |-- env.yaml  
|       |-- ipw_scaling_group.yaml  
|       |-- id_rsa.pub  
|-- lcmScripts  
    |-- pre_instantiation.py  
    |-- post_instantiation.py  
    |-- pre_termination.py
```

Note: You can configure multiple instances in the configurations folder. instance1_config is an example.

4. In the VNF-LCM **Workflows** screen, select **Instantiate vIPWorks VNF**, and click **Start a New Instance**.



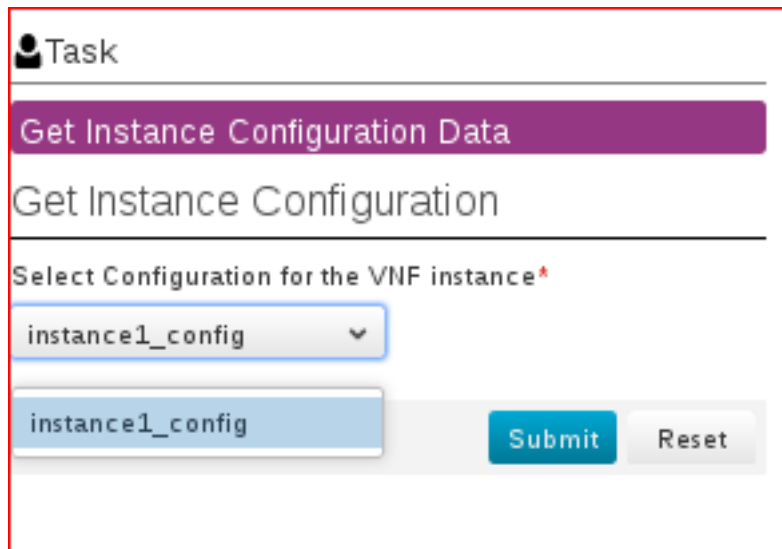


5. On the **Start a Workflow** screen, fill out the **Instance Name** field, and click **Submit**.
6. Select the newly created workflow from the **Instance Activity** panel.
7. On the **Workflow Instance** screen, add **VNF Name**, select VNF to instantiate, and click **Submit**.

The screenshot shows a web interface for a task titled 'Task'. Below the title is a purple button labeled 'Get VNF name and VNFD'. The main heading is 'Instantiate VNF'. There are two required fields: 'VNF Name*' with a text input containing 'vIPWorks_example', and 'Select VNF descriptor Id*' with a dropdown menu showing 'vIPWorks'. Below the dropdown is a light blue button also labeled 'vIPWorks'. To the right of this button are two buttons: 'Submit' (blue) and 'Reset' (grey).

Note:

- The **VNF Name** is also used as the heat stack name.
 - The **Select VNF descriptor Id** field lists all VNF releases available for instantiation that is in the /vnflcm-ext/backups/workflows/ipwvnfd/ folder.
8. On the **Get Instance Configuration** screen, select a VNF configuration to instantiate, and click **Submit**.



Task

Get Instance Configuration Data

Get Instance Configuration

Select Configuration for the VNF instance*

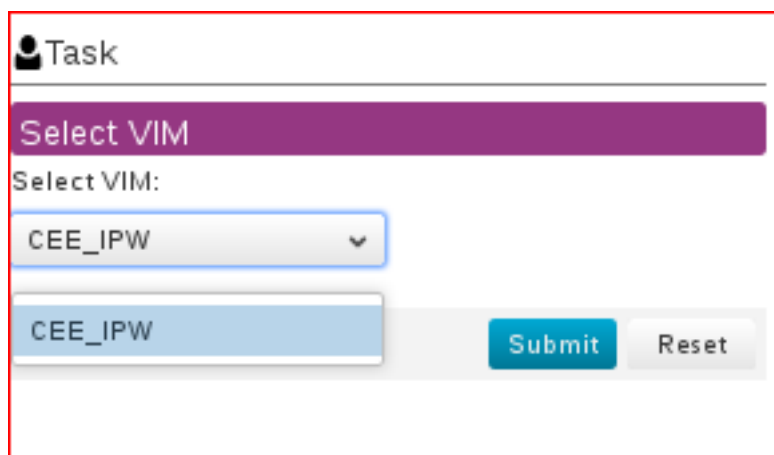
instance1_config

instance1_config

Submit Reset

Note: The **Select Configuration for the VNF instance** field lists all VNF configurations available for instantiation in the `/vnflcm-ext/backups/workflows/ipwvnfd/vIPWorks/configurations/` folder.

9. Click **Refresh**.
10. On the **Select VIM** screen, select a Vim, and click **Submit**.



Task

Select VIM

Select VIM:

CEE_IPW

CEE_IPW

Submit Reset

11. On the **Select Tenant** screen, select a tenant, and click **Submit**.



The screenshot shows a web interface titled 'Task'. Below the title is a purple bar with the text 'Select Tenant'. Underneath this bar is a dropdown menu also labeled 'Select Tenant' with 'admin' selected. Below the dropdown is a light blue button labeled 'Submit' and a grey button labeled 'Reset'.

Note: It will take a few minutes to complete. You can click **Refresh** to check the status of the task.

If you use the HDS platform with SDN, VNF-LCM would wait indefinitely during **Post Instantiation** after **Submit**. You need to configure the L2 gateway connections to continue. To learn how to configure L2 gateway connections, refer to section SDN Network Configuration for IPWorks VNF in IPWorks Deployment Guide, Reference [3]. After the configuration, the VNF-LCM can complete this process.

12. Modify the password for the user configured by the parameter <EMERGENCY_USER>.

Log on to IPWorks SC-1 as an <EMERGENCY_USER> user.

```
$ssh <EMERGENCY_USER>@<SC-1_IP_Address>
```

Note: For the parameter <EMERGENCY_USER>, the default value is **emergency**. The password is forcefully modified on first logging in. The default password is "emergency". For more information about the parameter <EMERGENCY_USER>, refer to the table "IPWorks VNF Deployment Parameter for HEAT Stack" in IPWorks Deployment Guide, Reference [3].

4.2 Scale VNF

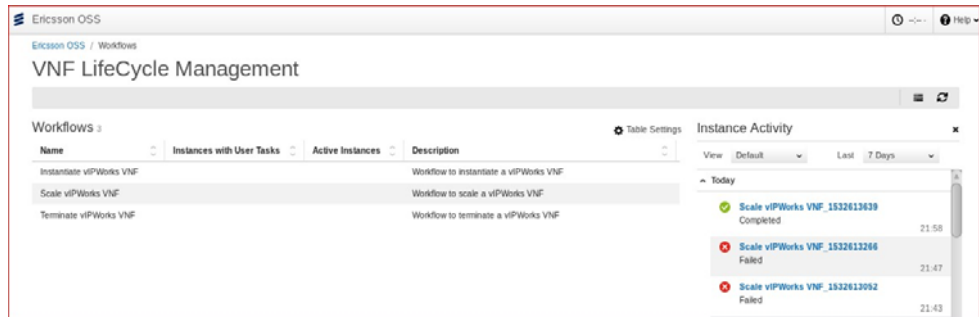
This section describes how to scale-out/in a VNF using VNF-LCM.

Continue with this procedure only if the VNF to be scaled is already instantiated by VNF-LCM.

Note: If the IPWorks is upgraded from a version earlier than 2.1 (include 2.1), make sure that the stack and workflow package are updated. For how to update the stack and workflow package, refer to section Update VNF Stack Deployed by VNF-LCM and IPWorks Workflow Package in IPWorks Upgrade Instruction, Reference [4].



1. In the VNF-LCM **Workflows** screen, select **Scale vIPWorks VNF**, and click **Start a New Instance**.



2. On the **Start a Workflow** screen, fill out the **Instance Name** field, and click **Submit**.
3. Select the newly created workflow from the **Instance Activity** panel.
4. On the **Select VIM** screen, select **Vim**, and click **Submit**.

Task

Select VIM

Select VIM:

CEE_IPW

CEE_IPW

Submit Reset

5. On the **Select Tenant** screen, select **Tenant**, and click **Submit**.

Task

Select Tenant

Select Tenant

admin

admin

Submit Reset



6. Click **Refresh**.
7. Select one scaling method from **Task** panel.

Task

Collect user data for Scale

Scale VNF instance

Scale Operation

Select Scale operation *

Scale-Out

Scale-In

Submit Reset

8. If Scale-Out is chosen, fill out the user data in **Task** panel, and click **Submit**.

Task

Collect user data for Scale-Out

Scale-Out VNF instance

Scale-Out Data

Select VNF instance *

ipw44

Number of additional VMs *

2

Availability zones for scaling separated by commas:

nova:compute-0-9.domain.tld,nova:compute-0-10.domain

Submit Reset



Note:

- The Availability zones for scaling separated by commas field is a list of zones which is corresponded to all the scaled VMs. For example, the first element in the list is for <VNFNAME>_Scale_0, the second is for <VNFNAME>_Scale_1, and so on. For how to find the available zone for VMs, refer to the nova command `nova availability-zone-list` and `nova host-describe` to check.
- If the total number of scaled-out VMs is more than the number of availability zone(s), the rest of VMs are assigned automatically.

Take an example to clarify how to scale out the VM for multiple times:

In the following example, 4 VMs are scaled out for 2 times, then the VMs are assigned to 4 zones in sequence.

a. First scale-out:

Number of additional VMs: 2

Availability zones: nova:compute-0-2.domain.tld,nova:compute-0-3.domain.tld

b. Second scale-out:

Number of additional VMs: 2

Availability zones: nova:compute-0-2.domain.tld,nova:compute-0-3.domain.tld,nova:compute-0-4.domain.tld,nova:compute-0-5.domain.tld

If the zones provided are not enough, the rest of VMs are assigned automatically.

If Scale-In is chosen, fill out the user data in **Task** panel, and click **Submit**.



Note: It will take a few minutes to complete. You can click **Refresh** to check the status of the task.

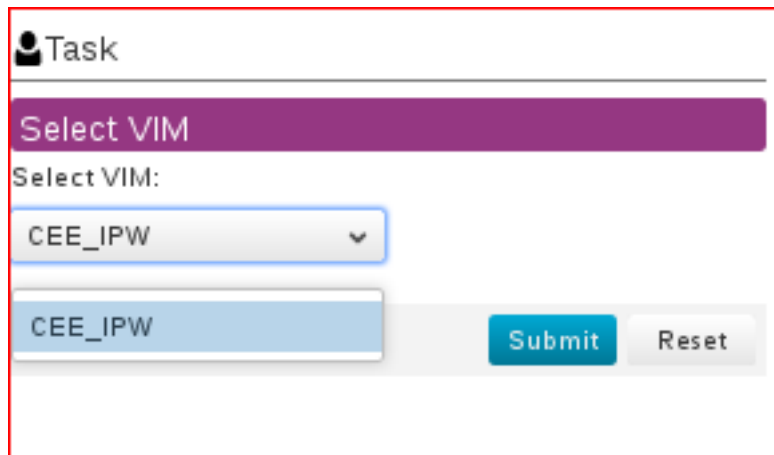
4.3 Terminate VNF

This section describes how to terminate a VNF using VNF-LCM.

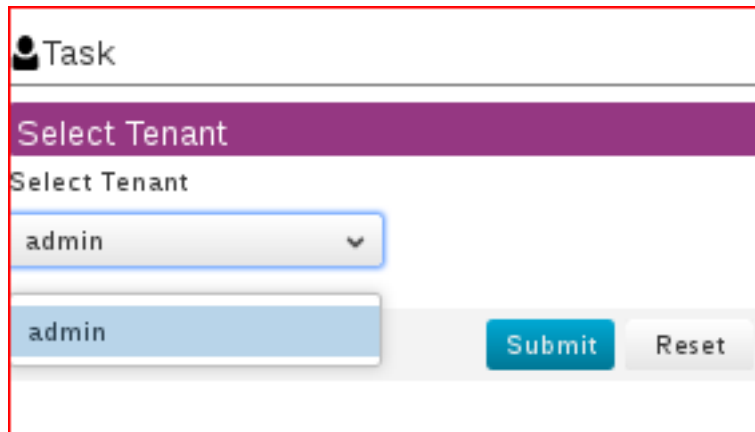
Continue with this procedure only if the VNF to be terminated is already instantiated by VNF-LCM.

1. In the VNF-LCM **Workflows** screen, select **Terminate VNF**, and click **Start a New Instance**.

2. On the **Start a Workflow** screen, fill out the **Instance Name** field, and click **Submit**.
3. Select the newly created workflow from the **Instance Activity** panel.
4. On the **Select VIM** screen, select **Vim**, and click **Submit**.



5. On the **Select Tenant** screen, select **Tenant**, and click **Submit**.



6. Click **Refresh**.
7. On the **Workflow Instance** screen, select the VNF that is to be terminated, select termination type, and click **Submit**.



Task

Collect user data for Terminate

Terminate VNF instance

Termination Data

Select VNF instance*

viPWorks_example

Termination type:

Graceful

Graceful termination timeout (sec)

-1

Submit

Reset

Note: It will take a few minutes to complete. You can click **Refresh** to check the status of the task.

The following options are available as termination types:



Table 1 Termination Types

Graceful	The VMs in the cluster are gracefully locked: the VNF instance gradually stops processing traffic, but there still might be a minor traffic loss. The VNF is terminated after the expiration of the graceful termination period.
Forceful	The VNF is terminated immediately, all ongoing traffic is lost. This option must be confirmed on the next screen, as it stops all traffic.
Graceful termination timeout (sec)	The graceful termination timeout value defines the time length from applying graceful termination to the termination of the VNF. Ongoing traffic still happens during this period. The default value is -1, which means the VNF is terminated only after all VMs stopped processing traffic.



Reference List

Documents

- [1] VNF-LCM CEE/Openstack Installation Instructions, 1/153 72-APR 901 0578
- [2] VNF-Lifecycle Manager System Administration Guide, 1543-APR 901 0578 Uen
- [3] IPWorks Deployment Guide, 21/1553-AVA 901 33/3 Uen
- [4] IPWorks Upgrade Instruction, 1/153 72-AVA 901 33/3 Uen