

Manual Scale-Out (Addition of SF) Feature of VPC-DI from Element Manager

Contents

[Introduction](#)

[Prerequisites](#)

[Requirements](#)

[Components Used](#)

[Background Information](#)

[Abbreviations](#)

[Workflow of the MoP](#)

[Procedure](#)

[Preparation of vnfc Configuration](#)

[New card vnfc Configuration](#)

[Execute to Add a New Card from EM](#)

[Monitoring Card addition Progress](#)

[Check Card Status](#)

Introduction

This document describes how to do manual scale-out (addition of one new Service Function card) to a running VPC-DI (Virtual Packet Core - Dual Instance) setup without the need to reload or redeploy VPC gateway, This feature is to support the requirement of new capacity expansion of gateway.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Cisco Ultra Virtual Packet Core solutions components
- Ultra Automation Services(UAS)
- Elastic Service Controllers (ESC)
- Openstack

Other than that you need these as prerequisites:

- VPC-DI full-stack instance running with the proper configuration in a healthy environment
- All required network configurations are in place related to DI (Dual Instance) and service networks of targetted new SF(Service Function) cards
- Required resources & permissions are available at Openstack level (Cloud) example, host, CPU RAM, and quota, etc.
- ESC is in a healthy condition.

- Any other dependency based on your cloud setup design like additional interface, networks or resource.
- Cloud status is healthy and there are no warnings or alarms.

Components Used

The information in this document is based on these software and hardware versions:

- USP 6.6
- ESC: 4.4.0(88)
- StarOS : 21.12.0 (71244)
- Cloud - CVIM 2.4.16
- UCS M4 C240 servers - 4pc

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

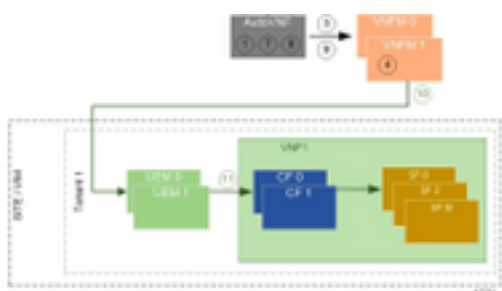
Background Information

The setup is called a standalone AutoVNF deployment setup where there are no NSO solutions. With this article, in an existing running VPC-DI setup, a person can add SF card from EM flawlessly to support additional capacity requirement,

It consists of these VMs types.

- AutoVNF VM - 1 instance
- Element Manager VM - 2 instance
- Control Function VM - 2 instance
- Session Function VM - 2 instance
- ESC (VNF) - 2instance (IN HA)

Currently, in VPC-DI gateway, you have one SF VM in running state i.e one SF card 3 is active at application levels, One more card (SF card 4) is added here as part of the scale-out activity.



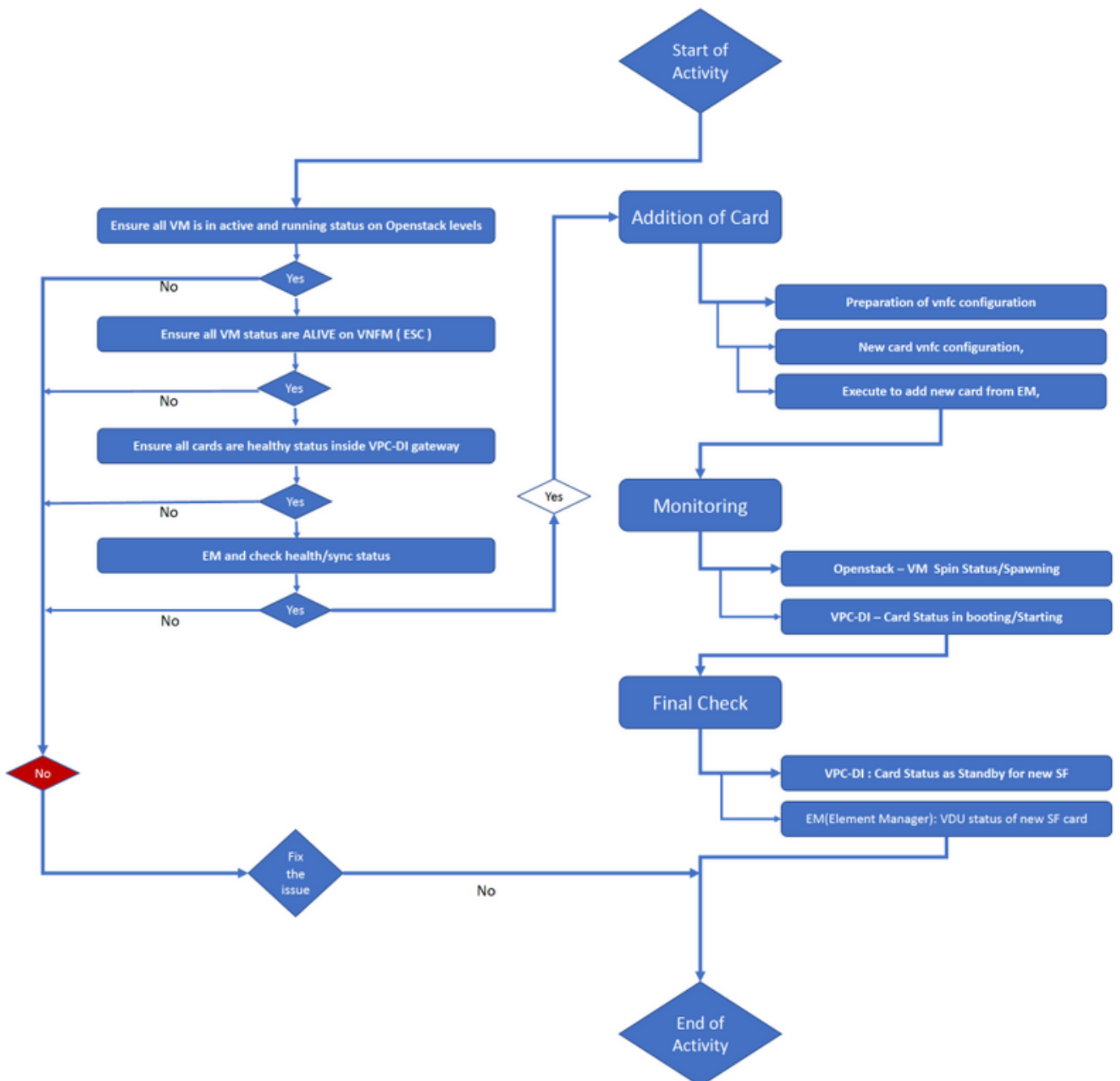
High level setup architecture

Abbreviations

HA	High Availability
VNF	Virtual Network Function
CF	Control Function
SF	Service Function
ESC	Elastic Service Controller
MOP	Method of Procedure

OSD	Object Storage Disks
HDD	Hard Disk Drive
SSD	Solid State Drive
VIM	Virtual Infrastructure Manager
VM	Virtual Machine
EM	Element Manager
UAS	Ultra Automation Services
UUID	Universally Unique Identifier

Workflow of the MoP



Procedure

Step 1. Ensure all VM is in an active and running status on Openstack levels.

```
nova list --tenant f35c8df20d6713430eda5565f241d74a399 --field
name,status,task_state,power_state
```

ID	Name	Status	Task State	Power State
f5e2e048-f013-4b17-b2af-c427bbafd043	lab-saegw-spgw-em-1	ACTIVE	None	Running
6a9a391a-e23c-4c1b-9d92-cdc3ed991c71	lab-saegw-spgw-em-2	ACTIVE	None	Running
ab08e077-aec7-4fa5-900c-11f5758998eb	lab-saegw-spgw-vdu-cf1-0	ACTIVE	None	Running
09524fd3-20ea-4eda-b8ff-4bd39c2af265	lab-saegw-spgw-vdu-cf1-1	ACTIVE	None	Running
ed6f7010-dabc-44ac-ae49-f625d297f8ad	lab-saegw-spgw-vdu-sf1-0	ACTIVE	None	Running

Step 2. Ensure all VM status are ALIVE on VNFM (ESC) monitoring. If any VM is in error, it has to fix it before proceeding with this activity.

DEPLOYMENT NAME	VM NAME	STATE
lab-saegw-spgw-em	lab-saegw-spgw-e_lab-sa_0_2a70c6b5-b9c7-4382-82a6-f1ad052bb824	VM_ALIVE_STATE
	lab-saegw-spgw-e_lab-sa_0_ea3113bc-7582-4b49-8876-a70bf1b74634	VM_ALIVE_STATE
lab-saegw-spgw-usp-em-6.6.0	lab-saegw-spgw-u_cf1_0_a7d8d54b-2d02-415e-93f8-907f90999e2b	VM_ALIVE_STATE
	lab-saegw-spgw-u_cf2_0_3a4f9330-2481-4178-94e3-a656dfa45bdd	VM_ALIVE_STATE
	lab-saegw-spgw-u_sf1_0_9cf03821-08bf-4ef3-b6bc-471d9bf869fc	VM_ALIVE_STATE

Step 3. Ensure all cards are healthy status inside VPC-DI gateway, and emctrl status is Alive.

```
[local]ugp-saegw# show card table
```

Slot	Card Type	Oper State	SPOF	Attach
1: CFC	Control Function Virtual Card	Active	Yes	
2: CFC	Control Function Virtual Card	Standby	-	
3: FC	6-Port Service Function Virtual Card	Active	Yes	

```
[local]ugp-saegw#
```

```
[local]ugp-saegw# show emctrl status
emctrl status:
emctrl in state: ALIVE
[local]ugp-saegw#
```

Step 4. Log in to EM and check health/sync status.

```
ubuntu@lab-saegw-spgw-em-1:~$ ncs_cli -u admin -C
admin@scm# show ems
EM          VNFM
ID  SLA  SCM  PROXY  VERSION
```

21 UP UP UP 6.6.0

```
admin@scm#  
admin@scm# show ncs-state ha  
ncs-state ha mode master  
ncs-state ha node-id AVNTSwpVTwABHAdV  
ncs-state ha connected-slave [ AVNTSwpVTwABHAdW ]  
admin@scm#
```

There are a few more lists of health checkups meant for EM which are out of the scope of this article. Hence, a suitable action must be taken accordingly if any other errors are observed.

Step 5. Addition of new SF Card 4 from EM.

Preparation of vnfc Configuration

Note: You must be careful in making vnfc configuration. It must not conflict with the existing vnfc cards. Hence ensure to do changes on top of your last vnfc. For example, if in gateway you have 5 cards in sf vdu, you have to pick and consider 5th vnfc card configuration for preparation of new card vnfc configuration. Get the existing last card vnfc configuration and target the highlighted variables to be changed to the next numbers for new cards on top of it as per this example. In our examples, the last card number is 3 and the new card number is 4.

```
admin@scm# show running-config vnfdservice:vnfd lab-saegw-spgw element-group ugp constituent-vdu  
vdu-sf1  
vnfdservice:vnfd lab-saegw-spgw  
element-group ugp  
constituent-vdu vdu-sf1  
vnfc sf1 >>>>>>>>>> has to change to "sf2"  
vim-id lab-saegw-spgw-vdu-sf1-0 >>>>>>>>>> has to change to "lab-saegw-spgw-vdu-sf1-1"  
vnfc-ref sf-vnfc-ugp  
host host-3 >>>>>>>>>> has to change to "host-4"  
lifecycle-event-initialization-variable staros_param.cfg  
destination-path-variables CARD_TYPE_NUM  
value 0x42070100  
!  
destination-path-variables SLOT_CARD_NUMBER  
value 3 >>>>>>>>>> has to change to "value 4"  
!  
destination-path-variables VNFM_PROXY_ADDRS  
value 172.20.20.21,172.20.20.22,172.20.20.23  
!  
!  
!  
!  
!
```

Copy the same vnfc configuration with change vnfc, vim-id, host, SLOT_CARD_NUMBER value variables to the suite to activate new card 4 as indicated above,

New card vnfc Configuration

After the above changes are performed to variables, vnfc, vim-id, host, SLOT_CARD_NUMBER , the final new card vnfc configuration is ready for activation.


```

Running      |
| ab08e077-aec7-4fa5-900c-11f5758998eb | lab-saegw-spgw-vdu-cf1-0 | ACTIVE | None      |
Running      |
| 09524fd3-20ea-4eda-b8ff-4bd39c2af265 | lab-saegw-spgw-vdu-cf1-1 | ACTIVE | None      |
Running      |
| ed6f7010-dabc-44ac-ae49-f625d297f8ad | lab-saegw-spgw-vdu-sf1-0 | ACTIVE | None      |
Running      |
| ba7edb9a-eba9-4e96-845b-6bb9041dfcfb | lab-saegw-spgw-vdu-sf1-1 | BUILD | spawning |
NOSTATE    |

```

```

+-----+-----+-----+-----+-----+
-----+
[root@PNQVFIBULD01 ~]#

```

At VPC-DI Gateway:

```

[local]ugp-saegw# show card table
Slot          Card Type                               Oper State   SPOF  Attach
-----
1: CFC        Control Function Virtual Card             Active       Yes
2: CFC        Control Function Virtual Card             Standby      -
3: FC         6-Port Service Function Virtual Card     Active       Yes
4: FC         6-Port Service Function Virtual Card     Starting    -
[local]ugp-saegw#
[local]ugp-saegw#

```

Check Card Status

VPC-DI:

```

[local]ugp-saegw# show card table
Slot          Card Type                               Oper State   SPOF  Attach
-----
1: CFC        Control Function Virtual Card             Active       Yes
2: CFC        Control Function Virtual Card             Standby      -
3: FC         6-Port Service Function Virtual Card     Active       No
4: FC         6-Port Service Function Virtual Card     Standby      -
[local]ugp-saegw#

```

EM (Element Manager):

```
admin@scm# show vnfmpoxy:vnfd vdus
```

NAME	ID	CARD TYPE	ID	CPU	UTILS	MEMORY	STORAGE	DEVICE	ELEMENT	IS	CONSTITUENT	
											GROUP	GROUP
INFRA	INITIALIZED	VIM ID	DEVICE NAME	USAGE	BYTES	BYTES						
lab-saegw-spgw	true	vdu-cf1	control-function	cf1	lab-saegw-spgw-cf-nc	cf-nc	ugp			true		
		ab08e077-aec7-4fa5-900c-11f5758998eb		-	-	-						
			cf2	lab-saegw-spgw-cf-nc	cf-nc	ugp				true		
	true	09524fd3-20ea-4eda-b8ff-4bd39c2af265		-	-	-						
			vdu-sf1	session-function	sf1	-	ugp			true		
	false	ed6f7010-dabc-44ac-ae49-f625d297f8ad		-	-	-						
			sf2	-	-	-	ugp			true		
	false	ba7edb9a-eba9-4e96-845b-6bb9041dfcfb		-	-	-						

Note: Manual scale-out(addition) of SFs is fully supported in 6.3 release.