

# Ultra-M元件管理器集群中的高可用性恢复 — vEPC

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## 简介

本文档介绍在托管StarOS虚拟网络功能(VNF)的Ultra-M设置的元素管理器(EM)集群中恢复高可用性(HA)所需的步骤。

## 背景信息

Ultra-M是预打包和验证的虚拟化移动数据包核心解决方案，旨在简化VNF的部署。Ultra-M解决方案包括上述虚拟机(VM)类型：

- 自动IT
- 自动部署
- 超自动化服务(UAS)
- 元素管理器(EM)
- 弹性服务控制器(ESC)
- 控制功能(CF)
- 会话功能(SF)

此图中描述了Ultra-M的高级体系结构和涉及的组件：



## UltraM架构

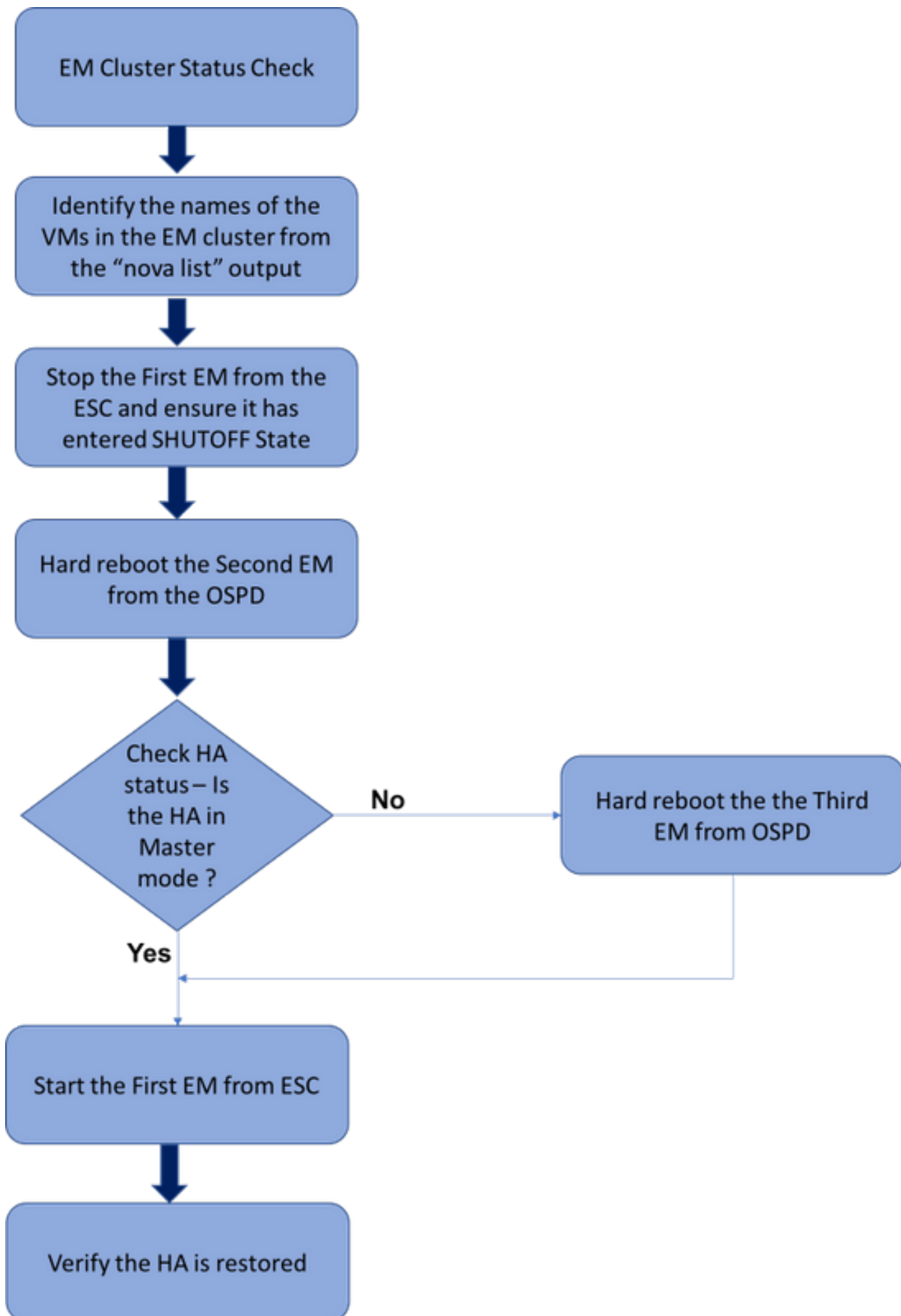
本文档面向熟悉Cisco Ultra-M平台的思科人员。

**注意：**为了定义本文档中的步骤，我们考虑了Ultra M 5.1.x版本。

## 缩写

HA	高可用性
VNF	虚拟网络功能
CF	控制功能
旧金山	服务功能
ESC	弹性服务控制器
MOP	程序方法
OSD	对象存储磁盘
硬盘	硬盘驱动器
SSD	固态硬盘
VIM	虚拟基础设施管理器
虚拟机	虚拟机
EM	元素管理器
UAS	超自动化服务
UUID	通用唯一IDentifier

## MoP的工作流



# 检查集群状态

登录活动EM并检查HA状态。可能有两种情况：

### 1. HA模式为无:

```
ubuntu@vnfd1deploymentem-0:~$ ncs_cli -u admin -C
admin@scm# show ncs-state ha
  ncs-state ha mode none
```

```
admin@scm# show ems
%no entries found%
```

### 2. EM群集只有一个节点 ( EM群集包含3个虚拟机 )：

```
ubuntu@vnfd1deploymentem-0:~$ ncs_cli -u admin -C
admin@scm# show ncs-state ha
ncs-state ha mode master
ncs-state ha node-id 2-1528893823
```

```
admin@scm# show ems
EM VNF
ID SLA SCM PROXY
```

```
-----
2 up down down
```

在这两种情况下，HA状态都可通过下一节中提到的步骤恢复。

# HA恢复程序

从nova列表中确定属于集群的EM的VM名称。EM集群中将包含三台虚拟机。

```
[stack@director ~]$ nova list | grep vnfd1
| e75ae5ee-2236-4ffd-a0d4-054ec246d506 | vnfd1-deployment_c1_0_13d5f181-0bd3-43e4-be2d-
ada02636d870 | ACTIVE | - | Running | tmo-autovnf2-uas-orchestration=172.18.180.22; DI-
INTERNAL2=192.168.2.17; DI-INTERNAL1=192.168.1.14; tmo-autovnf2-uas-management=172.18.181.23 |
| 33c779d2-e271-47af-8ad5-6a982c79ba62 | vnfd1-deployment_c4_0_9dd6e15b-8f72-43e7-94c0-
924191d99555 | ACTIVE | - | Running | tmo-autovnf2-uas-orchestration=172.18.180.13; DI-
INTERNAL2=192.168.2.14; DI-INTERNAL1=192.168.1.4; tmo-autovnf2-uas-management=172.18.181.21 |
| 65344d53-de09-4b0b-89a6-85d5cfdb3a55 | vnfd1-deployment_s2_0_b2cbf15a-3107-45c7-8edf-
1afc5b787132 | ACTIVE | - | Running | SERVICE-NETWORK1=192.168.10.4, 192.168.10.9; SERVICE-
NETWORK2=192.168.20.17, 192.168.20.6; tmo-autovnf2-uas-orchestration=172.18.180.12; DI-
INTERNAL2=192.168.2.6; DI-INTERNAL1=192.168.1.12 |
| e1a6762d-4e84-4a86-a1b1-84772b3368dc | vnfd1-deployment_s3_0_882cf1ed-fe7a-47a7-b833-
dd3e284b3038 | ACTIVE | - | Running | SERVICE-NETWORK1=192.168.10.22, 192.168.10.14; SERVICE-
NETWORK2=192.168.20.5, 192.168.20.14; tmo-autovnf2-uas-orchestration=172.18.180.14; DI-
INTERNAL2=192.168.2.7; DI-INTERNAL1=192.168.1.5 |
| b283d43c-6e0c-42e8-87d4-a3af15a61a83 | vnfd1-deployment_s5_0_672bbb00-34f2-46e7-a756-
52907e1d3b3d | ACTIVE | - | Running | SERVICE-NETWORK1=192.168.10.21, 192.168.10.24; SERVICE-
NETWORK2=192.168.20.21, 192.168.20.24; tmo-autovnf2-uas-orchestration=172.18.180.20; DI-
INTERNAL2=192.168.2.13; DI-INTERNAL1=192.168.1.16 |
| 637547ad-094e-4132-8613-b4d8502ec385 | vnfd1-deployment_s6_0_23cc139b-a7ca-45fb-b005-
733c98ccc299 | ACTIVE | - | Running | SERVICE-NETWORK1=192.168.10.13, 192.168.10.19; SERVICE-
NETWORK2=192.168.20.9, 192.168.20.22; tmo-autovnf2-uas-orchestration=172.18.180.16; DI-
```

```
INTERNAL2=192.168.2.19; DI-INTERNAL1=192.168.1.21 |
| 4169438f-6a24-4357-ad39-2a35671d29e1 | vnfd1-deployment_vnfd1-_0_02d1510d-53dd-4a14-9e21-
b3b367fef5b8 | ACTIVE | - | Running | tmo-autovnf2-uas-orchestration=172.18.180.6; tmo-autovnf2-
uas-management=172.18.181.8 |
| 30431294-c3bb-43e6-9bb3-6b377aefbc3d | vnfd1-deployment_vnfd1-_0_f17989e3-302a-4681-be46-
f2ebf62b252a | ACTIVE | - | Running | tmo-autovnf2-uas-orchestration=172.18.180.7; tmo-autovnf2-
uas-management=172.18.181.9 |
| 28ab33d5-7e08-45fe-8a27-dfb68cf50321 | vnfd1-deployment_vnfd1-_0_f63241f3-2516-4fc4-92f3-
06e45054dba0 | ACTIVE | - | Running | tmo-autovnf2-uas-orchestration=172.18.180.3; tmo-autovnf2-
uas-management=172.18.181.7 |
```

从ESC中停止其中一个EM，并检查它是否已进入关闭状态。

```
[admin@vnfm1-esc-0 esc-cli]$ /opt/cisco/esc/esc-confd/esc-cli/esc_nc_cli vm-action STOP vnfd1-
deployment_vnfd1-_0_02d1510d-53dd-4a14-9e21-b3b367fef5b8
```

```
[admin@vnfm1-esc-0 esc-cli]$ ./esc_nc_cli get esc_datamodel | egrep --color
"<state>|<vm_name>|<vm_id>|<deployment_name>"
<snip>
```

```
<state>SERVICE_INERT_STATE</state>
```

```
<vm_name>vnfd1-deployment_vnfd1-_0_f17989e3-302a-4681-be46-
f2ebf62b252a</vm_name>
<state>VM_ALIVE_STATE</state>
<vm_name>vnfd1-deployment_vnfd1-_0_f63241f3-2516-4fc4-92f3-
06e45054dba0</vm_name>
<state>VM_ALIVE_STATE</state>
```

现在，一旦EM进入“关闭状态”，请从OpenStack平台导向器(OSPD)重新启动另一个EM。

```
[stack@director ~]$ nova reboot --hard vnfd1-deployment_vnfd1-_0_f17989e3-302a-4681-be46-
f2ebf62b252a
```

```
Request to reboot server <Server: vnfd2-deployment_vnfd1-_0_f17989e3-302a-4681-be46-
f2ebf62b252a> has been accepted.
```

再次登录EM VIP并检查HA状态。

```
ubuntu@vnfd1deploymentem-0:~$ ncs_cli -u admin -C
admin@scm# show ncs-state ha
ncs-state ha mode master
ncs-state ha node-id 2-1528893823
```

如果HA处于“主”状态，请启动之前从ESC关闭的EM。否则，继续从OSPD重新启动下一个EM，然后再次检查HA状态。

```
[admin@vnfm1-esc-0 esc-cli]$ /opt/cisco/esc/esc-confd/esc-cli/esc_nc_cli vm-action START vnfd1-
deployment_vnfd1-_0_02d1510d-53dd-4a14-9e21-b3b367fef5b8
```

```
[admin@vnfm1-esc-0 esc-cli]$ ./esc_nc_cli get esc_datamodel | egrep --color
"<state>|<vm_name>|<vm_id>|<deployment_name>"
    <snip>

    <state>SERVICE_ACTIVE_STATE</state>
```

```
    <vm_name>vnfd1-deployment_vnfd1-_0_f17989e3-302a-4681-be46-
f2ebf62b252a</vm_name>
    <state>VM_ALIVE_STATE</state>
    <vm_name>vnfd1-deployment_vnfd1-_0_f63241f3-2516-4fc4-92f3-
06e45054dba0</vm_name>
    <state>VM_ALIVE_STATE</state>
```

从ESC启动EM后，检查EM的HA状态。它应该已经恢复。

```
admin@scm# em-ha-status
ha-status MASTER
admin@scm# show ncs-state ha
ncs-state ha mode master
ncs-state ha node-id 4-1516609103
ncs-state ha connected-slave [ 2-1516609363 ]
admin@scm# show ems
EM          VNFM
ID  SLA  SCM  PROXY
-----
2   up   up   up
4   up   up   up
```