

组网及说明

正常关机流程

1. 先把业务停掉，然后保障没有io下发后，umount所有节点的文件系统；
2. mmshutdown -a关闭所有集群节点，mmgetstate -a 观察所有节点状态是否为down；
3. mmgetstate -a确认所有节点服务down了之后就可以shutdown了。

提示“The /lib/modules/5.15.0-86-generic/extra/mmfslinux.ko kernel extension does not exist.”可能原因分为

- (1) 若非正常关机流程，而是机房意外掉电后重启，体现为全部私有客户端或部分客户端无法访问存储；
- (2) 部分客户端升级了kernel小版本，导致部分客户端无法自动重建GPL module

配置步骤

1. 进入无法访问的私有客户端，root权限用户，重建GPL module，重启GPFS服务

(base) sdses@client1:~\$ su root

密码：

```
root@client1:/home/sdses# /usr/lpp/mmfs/bin/mmbuildgpl <<重建GPL module
```

```
mmbuildgpl: Building GPL (5.1.6.1) module begins at 2023年 10月 07日 星期六 15:37:58 CST.
```

Verifying Kernel Header...

kernel version = 51500083 (515000083000000, 5.15.0-83-generic, 5.15.0-83)

module include dir = /lib/modules/5.15.0-83-generic/build/include

module build dir = /lib/modules/5.15.0-83-generic/build

kernel source dir = /usr/src/linux-5.15.0-83-generic/include

Found valid kernel header file under /lib/modules/5.15.0-83-generic/build/include

Getting Kernel Cipher mode...

Will use skcipher routines

Verifying Compiler...

make is present at /bin/make

cpp is present at /bin/cpp

gcc is present at /bin/gcc

g++ is present at /bin/g++

ld is present at /bin/ld

make World ...

make InstallImages ...

```
mmbuildgpl: Building GPL module completed successfully at 2023年 10月 07日 星期六 15:38:16 CST
```

```
root@client1:/home/sdses# /usr/lpp/mmfs/bin/mmstartup <<重新启动GPFS服务
```

```
2023年 10月 07日 星期六 15:38:32 CST: mmstartup: Starting GPFS ...
```

```
root@client1:/home/sdses# /usr/lpp/mmfs/bin/mmgetstate <<获取GPFS服务状态
```

```
Node number Node name GPFS state
```

```
-----  
6 client1 active
```

```
root@client1:/home/sdses# df -h <<可见挂载的文件夹
```

文件系统 容量 已用 可用 已用% 挂载点

udev 504G 0 504G 0% /dev

tmpfs 101G 3.6M 101G 1% /run

/dev/sda2 879G 94G 741G 12% /

tmpfs 504G 85M 504G 1% /dev/shm

tmpfs 5.0M 0 5.0M 0% /run/lock

tmpfs 504G 0 504G 0% /sys/fs/cgroup

/dev/loop0 128K 128K 0 100% /snap/bare/5

/dev/loop2 41M 41M 0 100% /snap/snapd/19993

/dev/loop1 62M 62M 0 100% /snap/core20/1611

```
/dev/loop3    64M  64M  0 100% /snap/core20/2015
/dev/loop4    74M  74M  0 100% /snap/core22/864
/dev/loop5    350M 350M  0 100% /snap/gnome-3-38-2004/143
/dev/loop6    347M 347M  0 100% /snap/gnome-3-38-2004/115
/dev/loop7     13M  13M  0 100% /snap/snap-store/959
/dev/loop11    92M  92M  0 100% /snap/gtk-common-themes/1535
/dev/loop12    41M  41M  0 100% /snap/snapd/20092
/dev/loop10    55M  55M  0 100% /snap/snap-store/558
/dev/loop9     486M 486M  0 100% /snap/gnome-42-2204/126
/dev/loop8     74M  74M  0 100% /snap/core22/858
/dev/sda1     511M 6.1M 505M  2% /boot/efi
tmpfs         101G 20K 101G  1% /run/user/125
/dev/loop13    497M 497M  0 100% /snap/gnome-42-2204/141
tmpfs         101G 36K 101G  1% /run/user/1000
synthesis01   128T 308G 128T  1% /sdscs
tmpfs         101G  0 101G  0% /run/user/0
root@client1:/home/sdscs# /usr/lpp/mmfs/bin/mmces service list
Enabled services: NFS
NFS is running
```

按照同样步骤，对其他无法访问的私有客户端执行 `/usr/lpp/mmfs/bin/mmbuildgpl`、`/usr/lpp/mmfs/bin/mmstartup` 操作，确保 GPFS 状态为 Active，存储挂载可见。

2、进入存储控制节点，重启 GPFS 服务，重建 GPL module

Last login: Mon Sep 18 18:24:22 2023

```
[root@ece1 ~]# mmhealth cluster show node <<获取集群节点状态
```

Component	Node	Status	Reasons
NODE	ece3.synthesis.com	HEALTHY	-
NODE	ece2.synthesis.com	HEALTHY	-
NODE	ece1.synthesis.com	HEALTHY	ces_ips_all_unassigned
NODE	ece4.synthesis.com	HEALTHY	-
NODE	gui.synthesis.com	FAILED	
gpfs_down,quorum_down,gui_pmsensors_connection_failed			
NODE	client1.synthesis.com	FAILED	nfsd_down,gpfs_down,local_exported_fs_unavail
NODE	client2.synthesis.com	FAILED	gpfs_down,quorum_down,unmounted_fs_check
NODE	client3.synthesis.com	FAILED	nfsd_down,gpfs_down,local_exported_fs_unavail
NODE	client4.synthesis.com	HEALTHY	-

```
[root@ece1 ~]# mmhealth cluster show <<获取集群状态
```

Component	Total	Failed	Degraded	Healthy	Other
NODE	9	4	0	5	0
GPFS	9	4	0	5	0
NETWORK	9	0	0	9	0
FILESYSTEM	1	0	1	0	0
DISK	16	0	0	16	0
CES	2	2	0	0	0
CESIP	1	1	0	0	0
FILESYSMGR	1	0	0	1	0
GUI	1	0	1	0	0
NATIVE_RAID	4	0	0	4	0
PERFMON	5	0	0	5	0
THRESHOLD	5	0	0	5	0

```
[root@ece1 ~]# mmstartup -a <<重新启动所有节点GPFS服务
```

Sun Oct 8 15:08:30 CST 2023: mmstartup: Starting GPFS ...

ece1.synthesis.com: The GPFS subsystem is already active.

ece3.synthesis.com: The GPFS subsystem is already active.

ece4.synthesis.com: The GPFS subsystem is already active.

ece2.synthesis.com: The GPFS subsystem is already active.

```
client4.synthesis.com: The GPFS subsystem is already active.
client3.synthesis.com: mmremote: startSubsys: The /lib/modules/5.15.0-86-
generic/extra/mmfslinux.ko kernel extension does not exist. Use mmbuildgpl command to create the
needed kernel extension for your kernel or copy the binaries from another node with the identical envi
ronment. <<提示执行mmbuildgpl为内核创建所需的内核扩展， 或从具有相同环境的其他节点复制
二进制文件。
client3.synthesis.com: mmremote: startSubsys: Unable to verify kernel/module configuration.
client1.synthesis.com: mmremote: startSubsys: The /lib/modules/5.15.0-83-
generic/extra/mmfslinux.ko kernel extension does not exist. Use mmbuildgpl command to create the
needed kernel extension for your kernel or copy the binaries from another node with the identical envi
ronment.
mmdsh: client3.synthesis.com remote shell process had return code 1.
client1.synthesis.com: mmremote: startSubsys: Unable to verify kernel/module configuration.
client2.synthesis.com: mmremote: startSubsys: The /lib/modules/5.15.0-83-
generic/extra/mmfslinux.ko kernel extension does not exist. Use mmbuildgpl command to create the
needed kernel extension for your kernel or copy the binaries from another node with the identical envi
ronment.
client2.synthesis.com: mmremote: startSubsys: Unable to verify kernel/module configuration.
mmdsh: client1.synthesis.com remote shell process had return code 1.
mmdsh: client2.synthesis.com remote shell process had return code 1.
mmstartup: Command failed. Examine previous error messages to determine cause.
[root@ece1 ~]# mmhealth cluster show
```

Component	Total	Failed	Degraded	Healthy	Other
NODE	9	4	0	5	0
GPFS	9	4	0	5	0
NETWORK	9	0	0	9	0
FILESYSTEM	1	0	1	0	0
DISK	16	0	0	16	0
CES	2	2	0	0	0
CESIP	1	1	0	0	0
FILESYSMGR	1	0	0	1	0
GUI	1	0	1	0	0
NATIVE_RAID	4	0	0	4	0
PERFMON	5	0	0	5	0
THRESHOLD	5	0	0	5	0

```
[root@ece1 ~]# mmhealth cluster show
```

Component	Total	Failed	Degraded	Healthy	Other
NODE	9	4	0	5	0
GPFS	9	4	0	5	0
NETWORK	9	0	0	9	0
FILESYSTEM	1	0	1	0	0
DISK	16	0	0	16	0
CES	2	2	0	0	0
CESIP	1	1	0	0	0
FILESYSMGR	1	0	0	1	0
GUI	1	0	1	0	0
NATIVE_RAID	4	0	0	4	0
PERFMON	5	0	0	5	0
THRESHOLD	5	0	0	5	0

```
[root@ece1 ~]#
[root@ece1 ~]#
[root@ece1 ~]#
[root@ece1 ~]#
[root@ece1 ~]#
[root@ece1 ~]#
[root@ece1 ~]# mmbuildgpl <<执行重建动作
```

```

-----
Verifying Kernel Header...
kernel version = 41800305 (418000305003001, 4.18.0-305.3.1.el8.x86_64, 4.18.0-305.3.1)
module include dir = /lib/modules/4.18.0-305.3.1.el8.x86_64/build/include
module build dir  = /lib/modules/4.18.0-305.3.1.el8.x86_64/build
kernel source dir  = /usr/src/linux-4.18.0-305.3.1.el8.x86_64/include
Found valid kernel header file under /usr/src/kernels/4.18.0-305.3.1.el8.x86_64/include
Getting Kernel Cipher mode...
Will use skcipher routines
Verifying Compiler...
make is present at /bin/make
cpp is present at /bin/cpp
gcc is present at /bin/gcc
g++ is present at /bin/g++
ld is present at /bin/ld
Verifying libelf devel package...
Verifying elfutils-libelf-devel is installed ...
Command: /bin/rpm -q elfutils-libelf-devel
The required package elfutils-libelf-devel is installed
Verifying Additional System Headers...
Verifying kernel-headers is installed ...
Command: /bin/rpm -q kernel-headers
The required package kernel-headers is installed
make World ...
make InstallImages .
-----

```

mmbuildgpl: Building GPL module completed successfully at Sun Oct 8 15:17:30 CST 2023.

继续确认节点及集群状态，启动过程稍慢，需耐心等待

```
[root@ece1 ~]# mmhealth cluster show
```

Component	Total	Failed	Degraded	Healthy	Other

NODE	9	3	0	6	0
GPFS	9	3	0	6	0
NETWORK	9	0	0	9	0
FILESYSTEM	1	0	1	0	0
DISK	16	0	0	16	0
CES	2	2	0	0	0
CESIP	1	1	0	0	0
FILESYSMGR	1	0	0	1	0
GUI	1	0	1	0	0
NATIVE_RAID	4	0	0	4	0
PERFMON	5	0	0	5	0
THRESHOLD	5	0	0	5	0

```
[root@ece1 ~]# mmhealth cluster show
```

Component	Total	Failed	Degraded	Healthy	Other

NODE	9	3	0	6	0
GPFS	9	3	0	6	0
NETWORK	9	0	0	9	0
FILESYSTEM	1	0	1	0	0
DISK	16	0	0	16	0
CES	2	2	0	0	0
CESIP	1	1	0	0	0
FILESYSMGR	1	0	0	1	0
GUI	1	0	1	0	0
NATIVE_RAID	4	0	0	4	0
PERFMON	5	0	0	5	0
THRESHOLD	5	0	0	5	0

```
[root@ece1 ~]# mmhealth cluster show node
```

Component	Node	Status	Reasons

NODE	ece3.synthesis.com	HEALTHY	-
NODE	ece2.synthesis.com	HEALTHY	-
NODE	ece1.synthesis.com	HEALTHY	ces_ips_all_unassigned
NODE	ece4.synthesis.com	HEALTHY	-
NODE	gui.synthesis.com	HEALTHY	
gui_pmsensors_connection_failed,time_not_in_sync,gui_refresh_task_failed			
NODE	client1.synthesis.com	FAILED	nfsd_down,gpfs_down,local_exported_fs_unavail
NODE	client2.synthesis.com	FAILED	gpfs_down,quorum_down,unmounted_fs_check
NODE	client3.synthesis.com	FAILED	nfsd_down,gpfs_down,local_exported_fs_unavail
NODE	client4.synthesis.com	HEALTHY	-

```
[root@ece1 ~]# mmgetstate -a
```

Node number Node name GPFS state

1	ece1	active
2	ece2	active
3	ece3	active
4	ece4	active
5	gui	active
6	client1	active
7	client2	down
8	client3	down
9	client4	active

```
[root@ece1 ~]# mmhealth cluster show node
```

Component	Node	Status	Reasons

NODE	ece3.synthesis.com	HEALTHY	-
NODE	ece2.synthesis.com	HEALTHY	-
NODE	ece1.synthesis.com	HEALTHY	-
NODE	ece4.synthesis.com	HEALTHY	-
NODE	gui.synthesis.com	HEALTHY	
gui_pmsensors_connection_failed,time_not_in_sync,gui_refresh_task_failed			
NODE	client1.synthesis.com	TIPS	nfs_in_grace,numactl_not_installed
NODE	client2.synthesis.com	FAILED	gpfs_down,quorum_down,unmounted_fs_check
NODE	client3.synthesis.com	FAILED	nfsd_down,gpfs_down,local_exported_fs_unavail
NODE	client4.synthesis.com	HEALTHY	-

```
[root@ece1 ~]# mmgetstate -a
```

Node number Node name GPFS state

1	ece1	active
2	ece2	active
3	ece3	active
4	ece4	active
5	gui	active
6	client1	active
7	client2	active
8	client3	arbitrating
9	client4	active

```
[root@ece1 ~]# mmgetstate -a
```

Node number Node name GPFS state

1	ece1	active
2	ece2	active
3	ece3	active

4 ece4 active
5 gui active
6 client1 active
7 client2 active
8 client3 active
9 client4 active

3、确认节点状态，按照TIPS提示进行既定动作

[root@ece1 ~]# mmhealth cluster show node

Component	Node	Status	Reasons

NODE	ece3.synthesis.com	HEALTHY	-
NODE	ece2.synthesis.com	HEALTHY	-
NODE	ece1.synthesis.com	HEALTHY	-
NODE	ece4.synthesis.com	HEALTHY	-
NODE	gui.synthesis.com	HEALTHY	-
gui_pmsensors_connection_failed,time_not_in_sync,gui_refresh_task_failed			
NODE	client1.synthesis.com	TIPS	numactl_not_installed
NODE	client2.synthesis.com	HEALTHY	-
NODE	client3.synthesis.com	TIPS	ces_network_ips_down,numactl_not_installed
NODE	client4.synthesis.com	HEALTHY	-
-			

[root@ece1 ~]# mmhealth cluster show

Component	Total	Failed	Degraded	Healthy	Other

NODE	9	0	0	7	2
GPFS	9	0	0	7	2
NETWORK	9	0	0	9	0
FILESYSTEM	1	0	0	1	0
DISK	16	0	0	16	0
CES	2	0	2	0	0
CESIP	1	0	0	1	0
FILESYSMGR	1	0	0	1	0
GUI	1	0	1	0	0
NATIVE_RAID	4	0	0	4	0
PERFMON	5	0	0	5	0
THRESHOLD	5	0	0	5	0

[root@ece1 ~]# mmhealth cluster show node

Component	Node	Status	Reasons

NODE	ece3.synthesis.com	HEALTHY	-
NODE	ece2.synthesis.com	HEALTHY	-
NODE	ece1.synthesis.com	HEALTHY	-
NODE	ece4.synthesis.com	HEALTHY	-
NODE	gui.synthesis.com	HEALTHY	-
gui_pmsensors_connection_failed,time_not_in_sync,gui_refresh_task_failed			
NODE	client1.synthesis.com	TIPS	numactl_not_installed
NODE	client2.synthesis.com	HEALTHY	-
NODE	client3.synthesis.com	TIPS	numactl_not_installed
NODE	client4.synthesis.com	HEALTHY	-

root@client1:/home/sdses# apt-get install numactl
正在读取软件包列表... 完成
正在分析软件包的依赖关系树
正在读取状态信息... 完成
下列软件包是自动安装的并且现在不需要了：
gir1.2-goa-1.0 nvidia-firmware-535-535.86.05

```
使用'apt autoremove'来卸载它(它们)。  
下列【新】软件包将被安装：  
numactl  
升级了 0 个软件包，新安装了 1 个软件包，要卸载 0 个软件包，有 14 个软件包未被升级。  
需要下载 38.5 kB 的归档。  
解压缩后会消耗 150 kB 的额外空间。  
获取:1 http://mirrors.aliyun.com/ubuntu focal/main amd64 numactl amd64 2.0.12-1 \[38.5 kB\]  
已下载 38.5 kB，耗时 0秒 (211 kB/s)  
正在选中未选择的软件包 numactl。  
(正在读取数据库 ... 系统当前共安装有 217894 个文件和目录。)  
准备解压 .../numactl_2.0.12-1_amd64.deb ...  
正在解压 numactl (2.0.12-1) ...  
正在设置 numactl (2.0.12-1) ...  
正在处理用于 man-db (2.9.1-1) 的触发器 ...  
root@client1:/home/sdses#
```

```
[root@ece1 ~]# mmhealth cluster show node
```

Component	Node	Status	Reasons
NODE	ece3.synthesis.com	HEALTHY	-
NODE	ece2.synthesis.com	HEALTHY	-
NODE	ece1.synthesis.com	HEALTHY	-
NODE	ece4.synthesis.com	HEALTHY	-
NODE	gui.synthesis.com	HEALTHY	
gui_pmsensors_connection_failed,time_not_in_sync,gui_refresh_task_failed			
NODE	client1.synthesis.com	HEALTHY	-
NODE	client2.synthesis.com	HEALTHY	-
NODE	client3.synthesis.com	HEALTHY	-
NODE	client4.synthesis.com	HEALTHY	-

配置关键点

见配置步骤