HPE Gen11 服务器 MR 系列阵列卡 Windows/Linux/VMware 系统下通过 StorCLI 配置阵列

目录

一. 适用范围与注意事项

- 本文档旨在说明 HPE Gen11 系列服务器 MR 系列阵列卡不同系统下使用 MegaRAID Storage Administrator StorCLI 工具配置阵列的方法，并以 DL360 Gen11 服务器为例进行配置步骤说明。
  MR 系列阵列卡包含如下型号：
  - HPE MR416i-p Gen11
  - HPE MR416i-o Gen11
  - HPE MR216i-p Gen11
  - HPE MR216i-o Gen11
  - HPE MR408i-o Gen11
- 实际情况是否适用本文档，请通过下面导航链接进行确认：
  https://zhiliao.h3c.com/Theme/details/218271
- 提示：
  本文档中的信息（包括产品，软件版本和设置参数）仅作参考示例，具体操作与目标需求设置请以实际为准。
  本文档不定期更新维护，请以发布的最新版本为准。

二. 配置准备

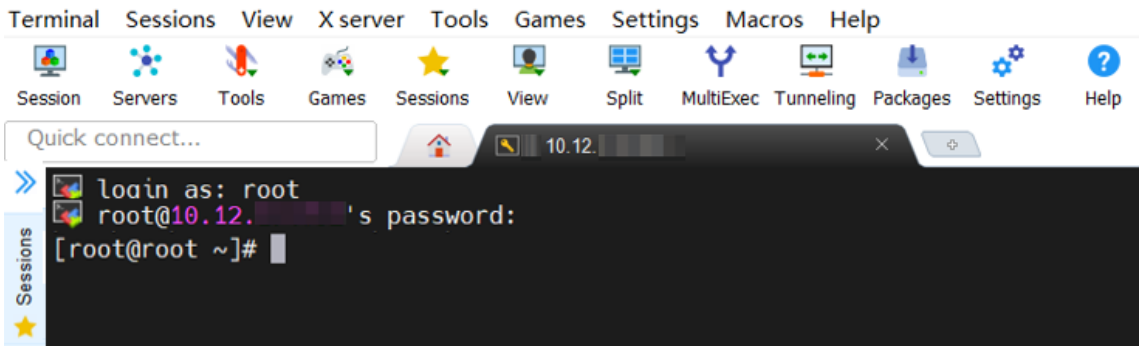
1. 下载 MegaRAID Storage Administrator StorCLI 工具
   - Windows 下载链接：HPE MegaRAID Storage Administrator StorCLI for Windows 64-bit (for Gen10 Plus and Gen11 Controllers) | HPE Support
   - Linux 下载链接：HPE MegaRAID Storage Administrator StorCLI for Linux 64-bit (for Gen10 Plus and Gen11 Controllers) | HPE Support
   - VMware 下载链接：
     - ESXi 7.0：HPE MegaRAID Storage Administrator StorCLI for VMware7.0 | HPE Support
     - ESXi 8.0：HPE MegaRAID Storage Administrator StorCLI for VMware8.0 | HPE Support
2. 连接 iLO 与启用远程控制台
   具体方法请参考：https://zhiliao.h3c.com/Theme/details/216337

三. 配置步骤

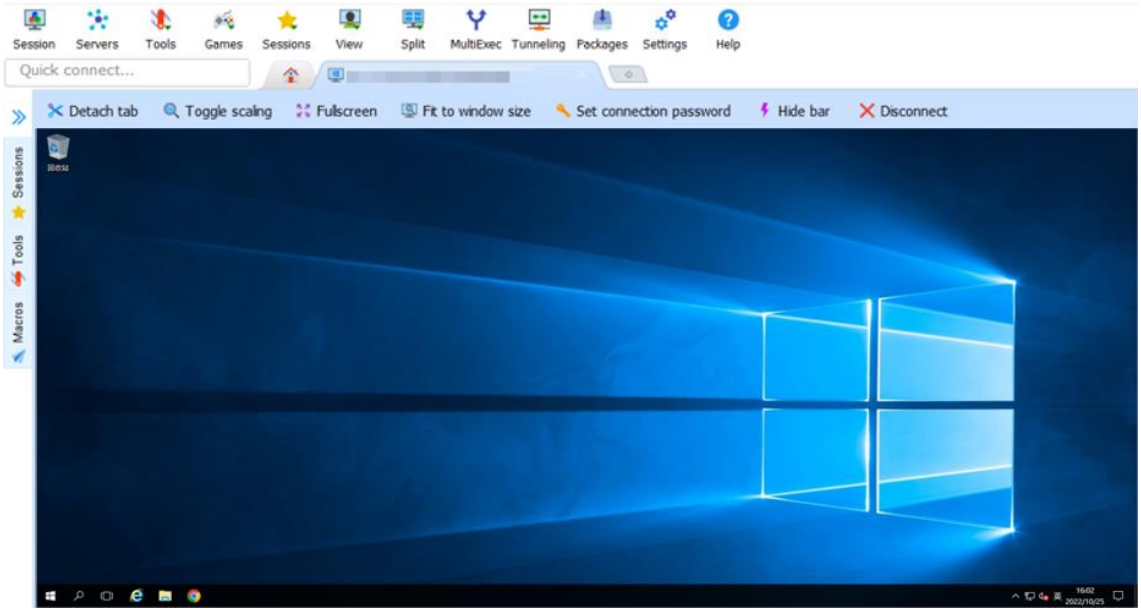
1. 访问系统
   1.1 通过 iLO 6 启用远程控制台访问系统（Windows Server，Linux，VMware ESXi）
   iLO 6 页面 Information -> Overview 的 Remote Console 选项，或页面左下方 Remote

Console 选区可直接启用远程控制台；也可在 Remote Console & Media - iLO Integrated Remote Console 页面进行选择。本文以 HTML5 远程控制台为例。

1.2 通过第三方 SSH 工具访问系统（Linux，VMware ESXi）



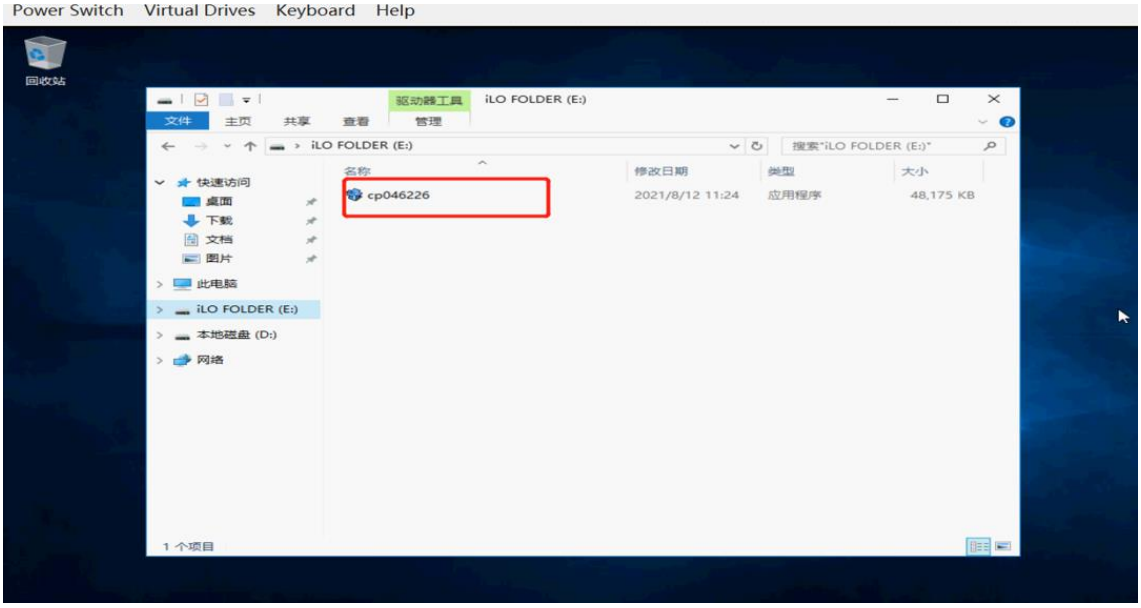
1.3 通过远程桌面或第三方 RDP 工具访问系统（Windows Server）



2. 将 MegaRAID Storage Administrator StorCLI 工具保存到系统下

2.1 Windows Server

2.1.1 通过 iLO 启用远程控制台将工具挂载到系统下



2.1.2 通过 U 盘将文件挂载到系统下

U 盘接入服务器后，在系统下直接访问挂载点。

2.2 Linux

2.2.1 通过 iLO 启用远程控制台将工具挂载到系统下

```
[root@localhost ~]# lsblk
NAME            MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda               8:0    0 837.9G  0 disk
├─sda1            8:1    0   200M  0 part /boot/efi
├─sda2            8:2    0     1G  0 part /boot
└─sda3            8:3    0 836.7G  0 part
  ├─rhel-root   253:0    0    50G  0 lvm  /
  ├─rhel-swap   253:1    0     4G  0 lvm  [SWAP]
  └─rhel-home   253:5    0 782.7G  0 lvm  /home
sdc               8:32   1    16M  1 disk /run/media/root/iLO FOLDER
nvme0n1         259:0    0 372.6G  0 disk
├─nvme0n1p1     259:2    0   200M  0 part
├─nvme0n1p2     259:3    0     1G  0 part
└─nvme0n1p3     259:4    0 371.4G  0 part
  ├─rhel00-swap 253:2    0     4G  0 lvm
  ├─rhel00-home 253:3    0 317.4G  0 lvm
  └─rhel00-root 253:4    0    50G  0 lvm
nvme1n1         259:1    0 372.6G  0 disk
[root@localhost ~]# mount /dev/sdc /mnt
mount: /dev/sdc is write-protected, mounting read-only
[root@localhost ~]# cd /mnt
[root@localhost mnt]# ls
storcli-007.1616.0000.0000-1.x86_64.rpm
```

2.2.2 通过 U 盘将文件挂载到系统下

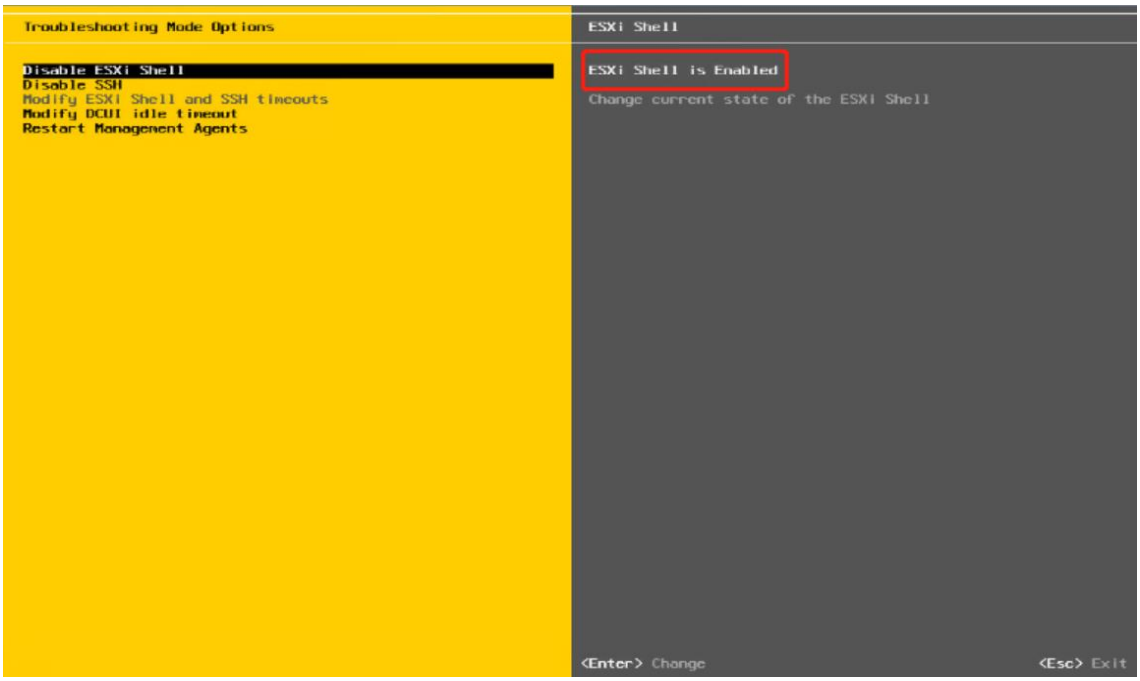
U 盘接入服务器后，在系统下通过 mount 命令挂载。

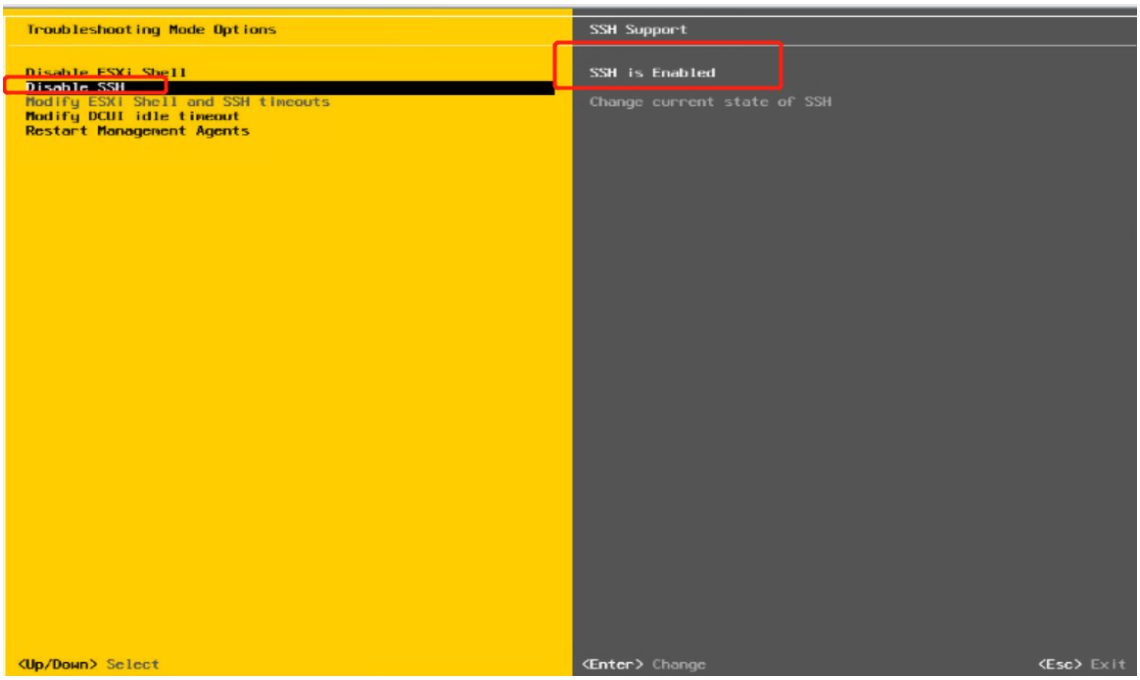
2.2.3 通过第三方 SSH 工具将文件保存到系统下

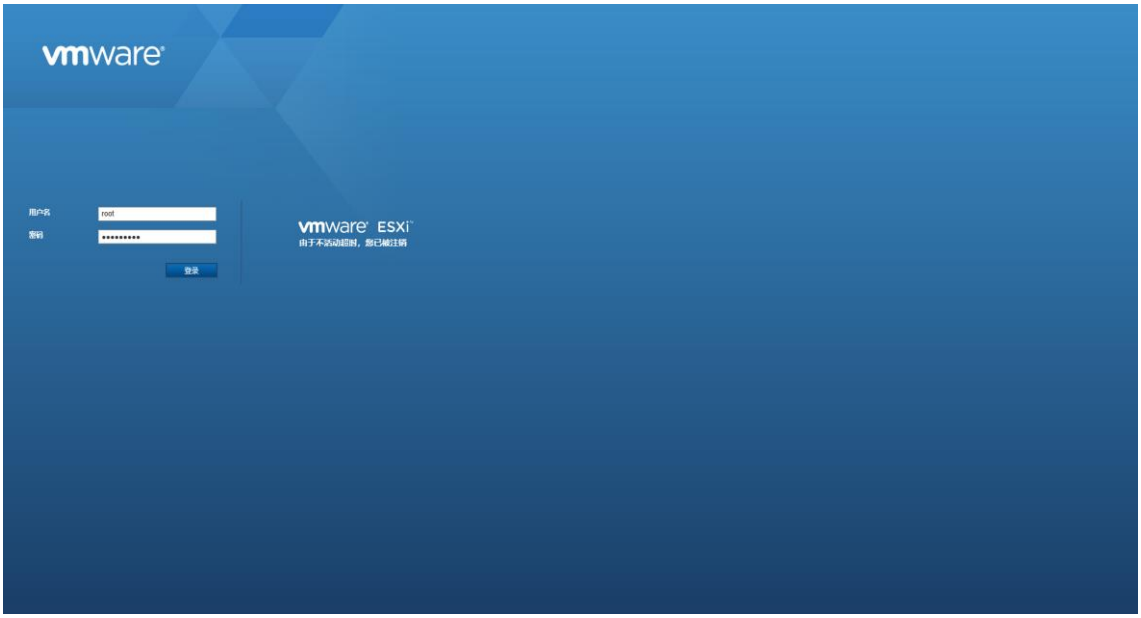
参考第三方工具使用说明。

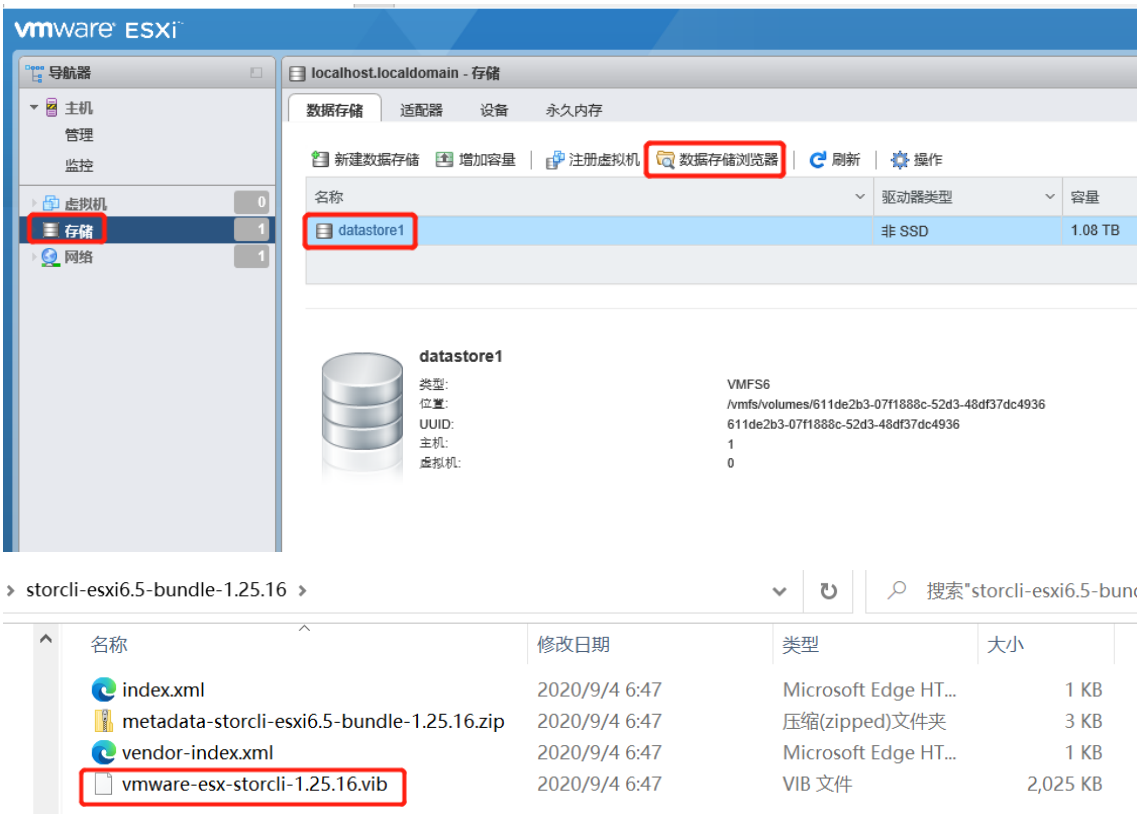
2.3 VMware ESXi

2.3.1 启用 Shell 并通过 Web Client 将文件保存到系统下




Troubleshooting Mode Options
Disable ESXi Shell
Disable SSH
Modify ESXi Shell and SSH timeouts
Modify DCUI idle timeout
Restart Management Agents
SSH Support
SSH is Enabled
Change current state of SSH
<Up/Down> Select
<Enter> Change
<Esc> Exit


vmware
root
vmware ESXi



2.3.2 通过第三方 SSH 工具将文件保存到系统下

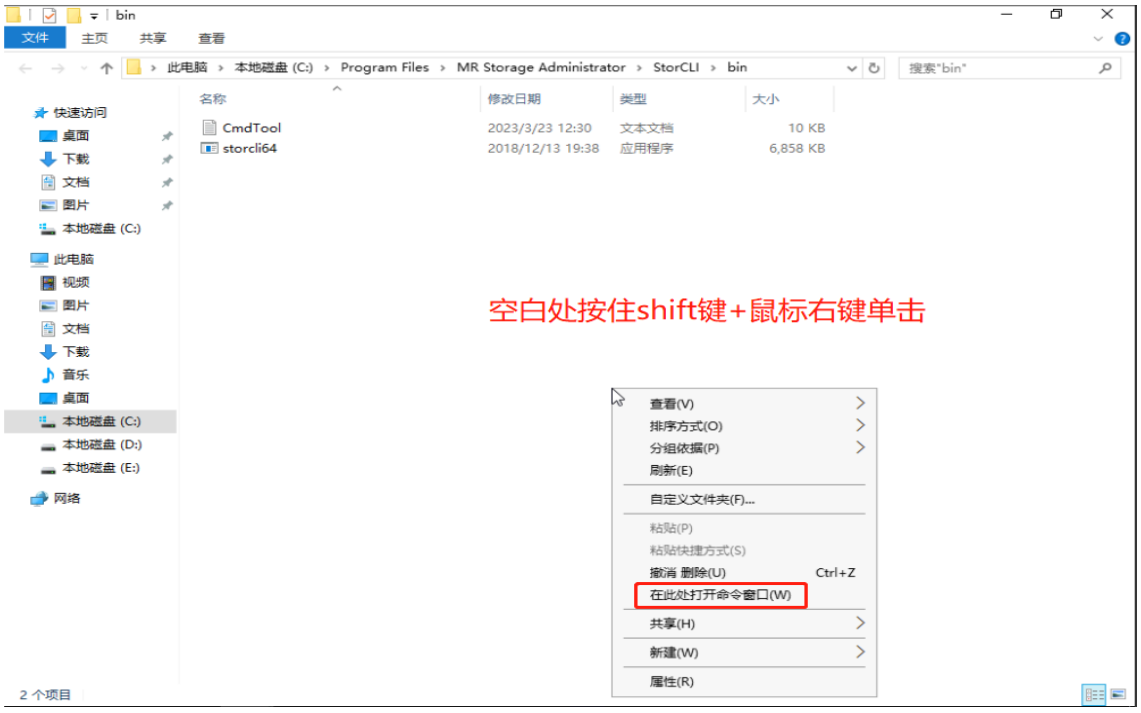
参考第三方工具使用说明。

3. 安装 MegaRAID Storage Administrator StorCLI

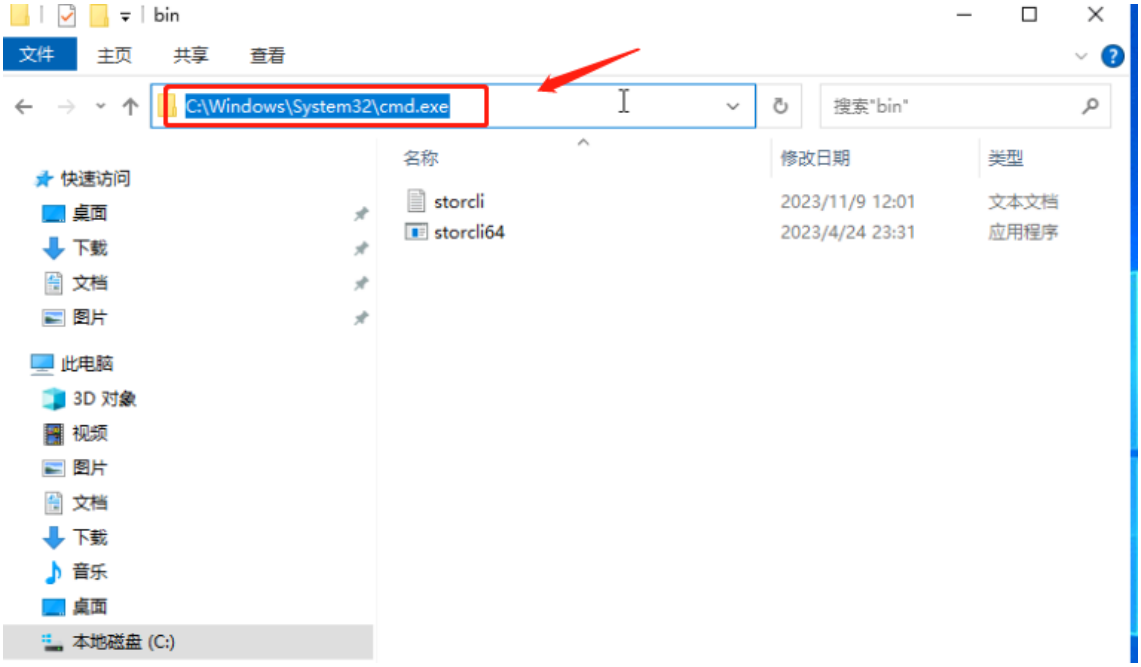
3.1 Windows Server

1) 双击运行开始安装 Storcli 工具。

2) 找到 Storcli 工具所在位置，按住 shift 键，然后鼠标右键点击空白处，打开命令窗口。



或找到 Storcli 工具所在位置，地址栏输入 cmd 打开命令窗口。



3) 进入命令行界面输入 storcli64.exe，即可运行 storcli 工具。

```
C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe show all
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Status Code = 0
Status = Success
Description = None

Number of Controllers = 1
Host Name = WIN-MD40N42GIK2
Operating System  = Windows Server 2019
StoreLib IT Version = 07.2403.0200.0000
StoreLib IR3 Version = 16.14-0

System Overview :
===============

-----------------------------------------------------------------------
Ctl Model            Ports PDs DGs DNOpt VDs VNOpt BBU sPR DS EHS ASOs Hlth
-----------------------------------------------------------------------
  0 HPEMR416i-pGen11    16   8   1     0   1     0 Opt On  -  N      4 Opt
-----------------------------------------------------------------------

Ctl=Adapter Index|DGs=Arrays|VDs=Virtual drives/Logical drives|Fld=Failed
PDs=Physical drives|DNOpt=Array NotOptimal|VNOpt=LD NotOptimal|Opt=Optimal
Msng=Missing|Dgd=Degraded|NdAtn=Need Attention|Chrg=Charging|MsngCbl=Missing Cable
Unkwn=Unknown|sPR=Scheduled Patrol Read|DS=DimmerSwitch|EHS=Emergency Spare Drive
Y=Yes|N=No|ASOs=Advanced Software Options|BBU=Energy Pack
```

3.2 Linux

1) rpm –ivh 安装 Storcli 工具。

```
[root@localhost Storcli]# ls
storcli-007.1616.0000.0000-1.x86_64.rpm
[root@localhost Storcli]# rpm -ivh storcli-007.1616.0000.0000-1.x86_64.rpm
warning: storcli-007.1616.0000.0000-1.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID 26
c2b797: NOKEY
Verifying...                          ################################# [100%]
Preparing...                          ################################# [100%]
Updating / installing...
   1:storcli-007.1616.0000.0000-1     ################################# [100%]
```

进到默认安装路径下，./storcli64 命令运行。

```
[root@localhost /]# cd /opt/hpe/storcli/
[root@localhost storcli]# ls
storcli64
[root@localhost storcli]# ./storcli64

      StorCli SAS Customization Utility Ver 007.1616.0000.0000 Dec 24, 2020

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help - lists all the commands with their usage. E.g. storcli help
<command> help - gives details about a particular command. E.g. storcli add help

List of commands:

Commands    Description
```

3.3 VMware ESXi

1) 进入文件所在位置，使用 **unzip + xxx.zip** 解压，得到.vib 文件。

```
[root@localhost:/tmp/storcli] ls
BCM-vmware-storcli64_007.1616.0000.0000-01_17650073.zip
[root@localhost:/tmp/storcli] unzip BCM-vmware-storcli64_007.1616.0000.0000-01_17650073.zip
Archive:  BCM-vmware-storcli64_007.1616.0000.0000-01_17650073.zip
  inflating: index.xml
  inflating: vendor-index.xml
  inflating: metadata.zip
  inflating: vib20/vmware-storcli64/BCM_bootbank_vmware-storcli64_007.1616.0000.0000-01.vib
```

2) 使用 **esxcli software vib install -v [软件包所在的绝对路径] [.vib 文件名]进行**安装。

```
[root@localhost:/tmp/storcli] esxcli software vib install -v /tmp/storcli/vib20/vmware-storcli64/BCM_bootbank_vmware-storcli64_007.1616.0000.0000-01.v
ib --no-sig-check
Installation Result
   Message: Operation finished successfully.
   Reboot Required: false
   VIBs Installed: BCM_bootbank_vmware-storcli64_007.1616.0000.0000-01
   VIBs Removed:
   VIBs Skipped:
```

3) 工具默认安装在/opt/hpe/storcli64 目录下，使用 cd /opt/hpe/storcli64/进入此目录。

```
[root@localhost:/opt/hpe/storcli64] cd /opt/hpe/storcli64/
[root@localhost:/opt/hpe/storcli64] ls
libstorelib.so  storcli.log     storcli64
```

4. 获取阵列卡编号、逻辑盘编号和物理盘编号（命令通用）

1) **storcli64.exe show all** 查看当前阵列卡型号及编号：MR416 i-p 阵列卡，编号：C0。

```
C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe show all
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Status Code = 0
Status = Success
Description = None

Number of Controllers = 1
Host Name = WIN-MD40N42GIK2
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StoreLib IT Version = 07.2403.0200.0000
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-----------------------------------------------------------------------------

Ctl=Adapter Index|DGs=Arrays|VDs=Virtual drives/Logical drives|Fld=Failed
PDs=Physical drives|DNOpt=Array NotOptimal|VNOpt=LD NotOptimal|Opt=Optimal
Msng=Missing|Dgd=Degraded|NdAtn=Need Attention|Chrg=Charging|MsngCbl=Missing Cable
Unkwn=Unknown|sPR=Scheduled Patrol Read|DS=DimmerSwitch|EHS=Emergency Spare Drive
Y=Yes|N=No|ASOs=Advanced Software Options|BBU=Energy Pack
```
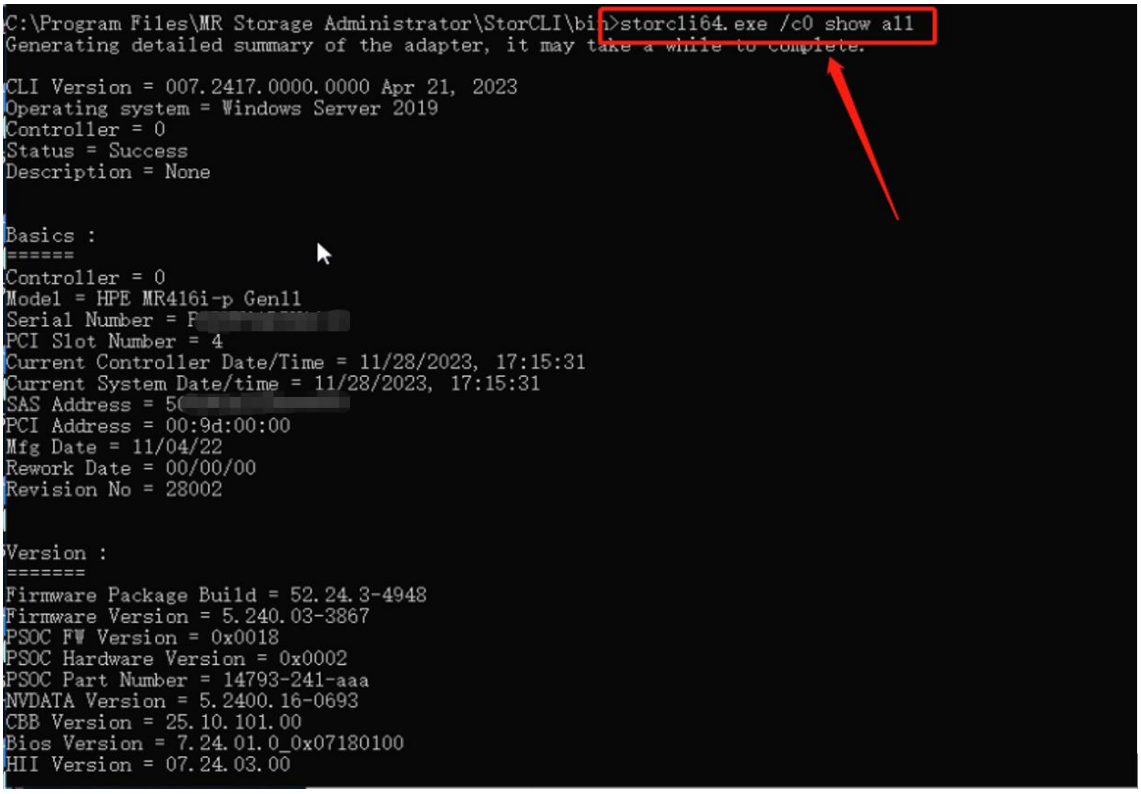
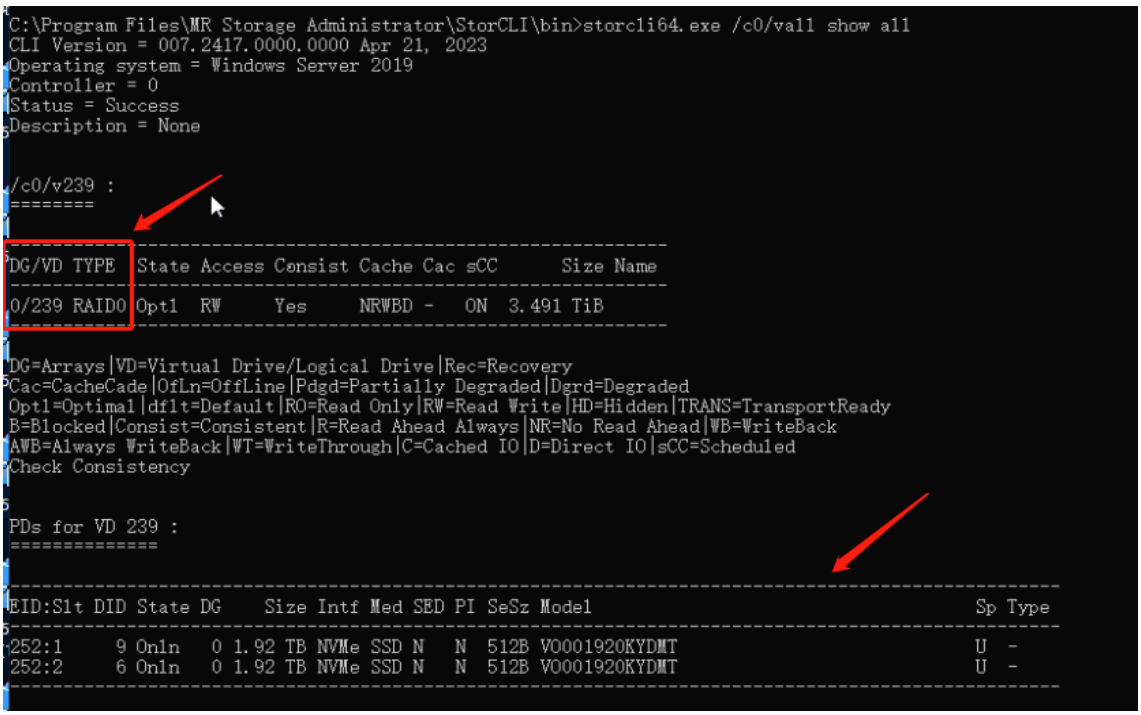
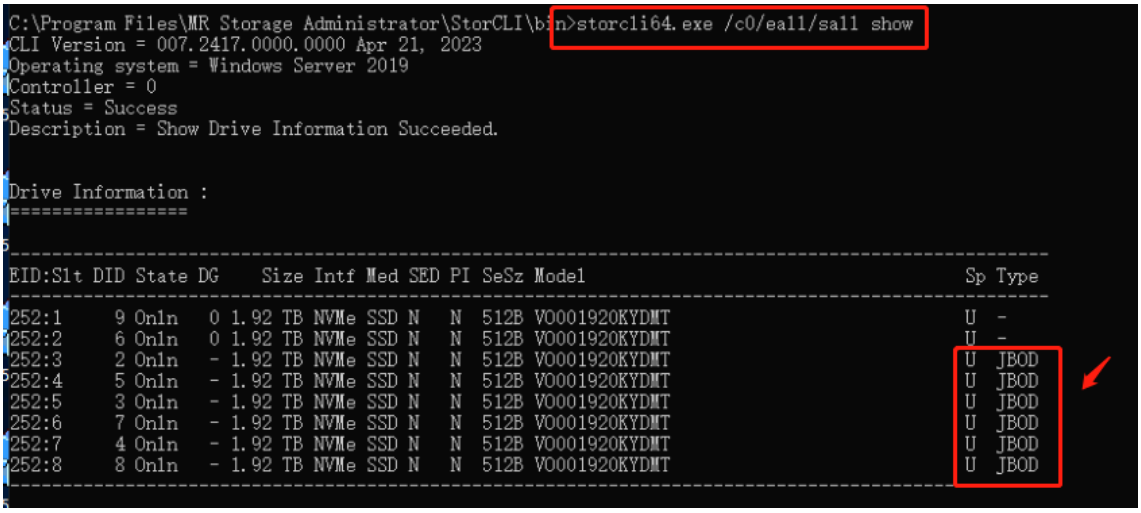

2) **storcli64.exe /c0 show all** 显示控制器列表和控制器相关信息。



3) **storcli64.exe /c0/vall show** 查看逻辑盘信息：一个逻辑卷，级别为 raid 0。



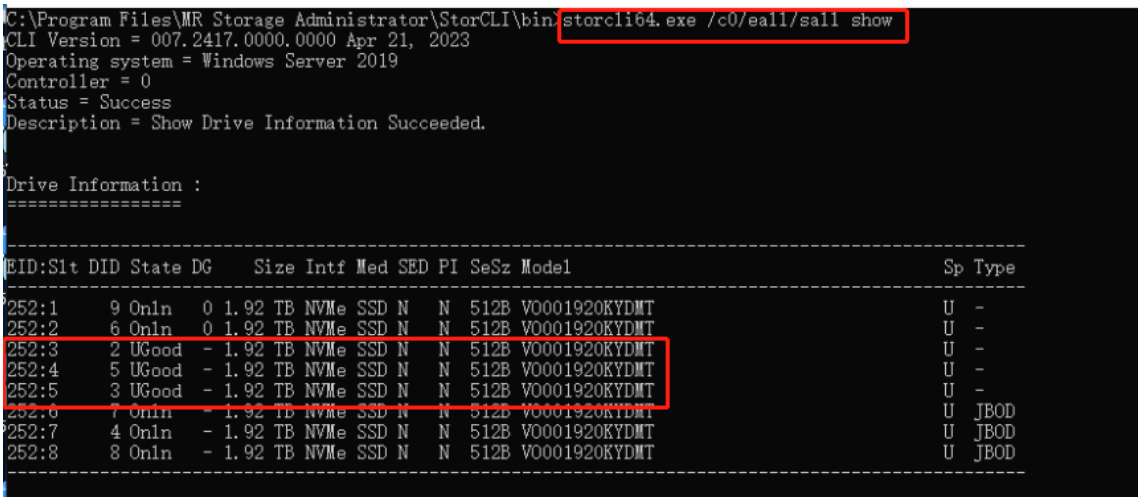
4) **storcli64.exe /c0/eall/sall show** 查看物理盘信息：共 8 块物理盘，type 为 JBOD 的是直通盘。



5. 创建与删除阵列

5.1 创建阵列

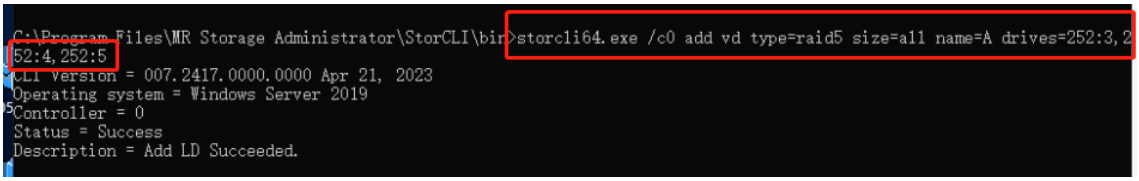
1）**storcli64.exe /c0/eall/sall show** 确认目标物理硬盘的 EID：Slt 信息。



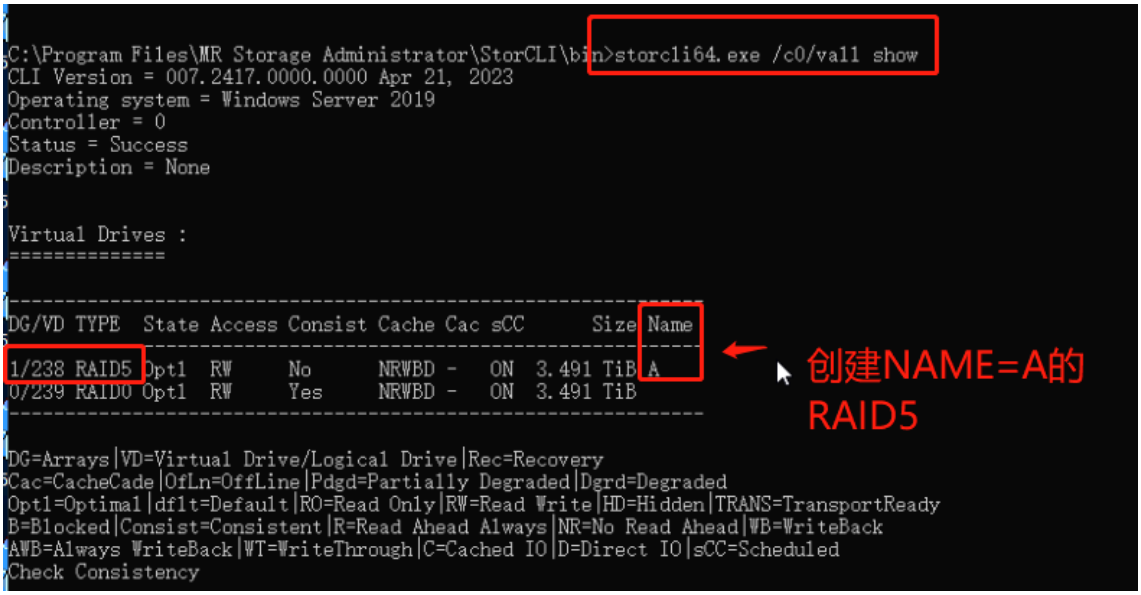
注：JBOD 硬盘无法创建阵列，直接创建会出现报错。配置阵列需要将硬盘状态修改为 UG（unconfiguration good）。设置硬盘状态参考下文：设置与取消直通盘。

2）**storcli64.exe /c0 add vd type=raid5 size=all name=A drives= 252:3,252:4,252:5** 创建阵列。

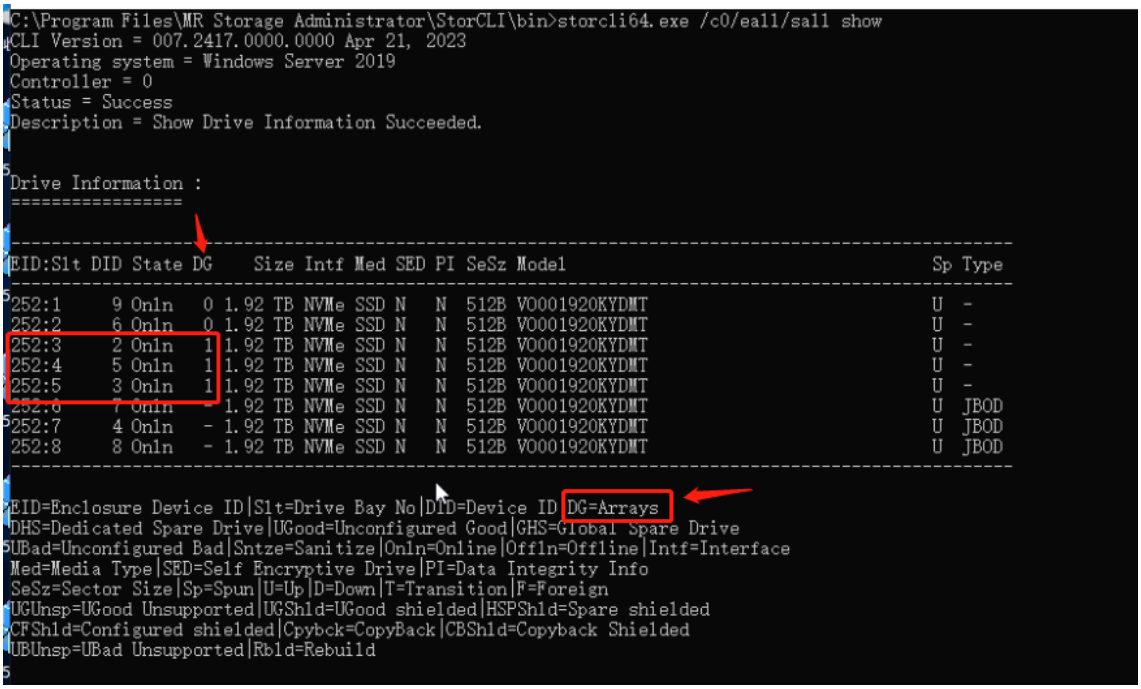
注：add vd 添加逻辑卷，type=raid5 阵列级别为 raid5，size=all 使用全部空间创建 name=A 阵列名称为 A，drives= 252:3,252:4,252:5 使用 EID：Slt 信息为 251:1,251:2,252:5 的硬盘创建阵列。



3）**storcli64.exe /c0/vall show** 查看逻辑卷信息，阵列 A 创建成功。

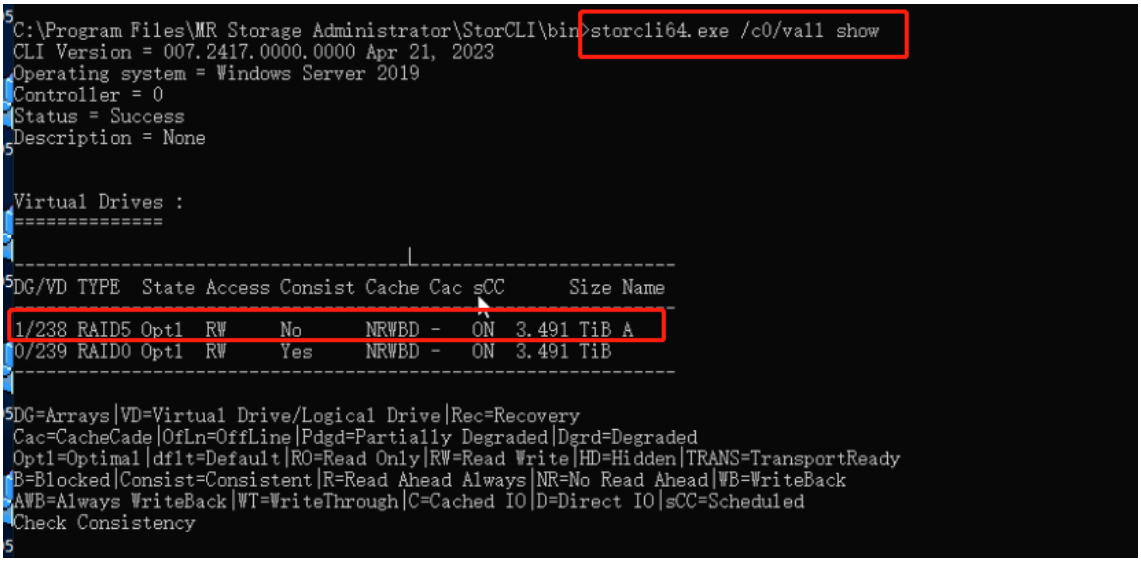


4）查看物理盘信息，阵列中的硬盘状态变为 online 状态，硬盘后参数 DG 存在值。

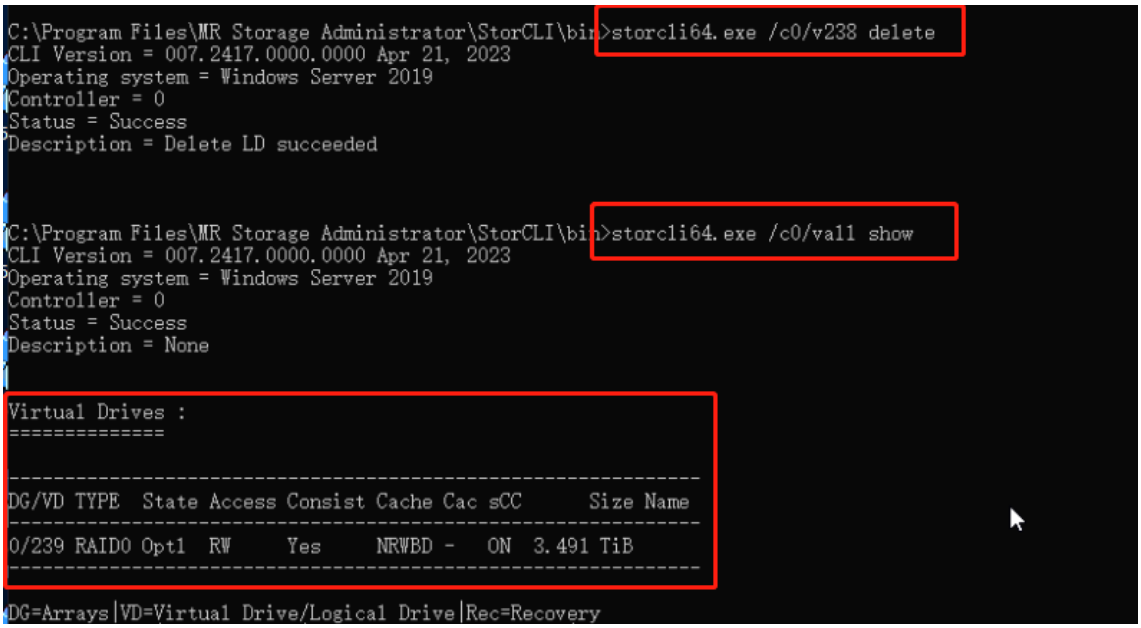


5.2 删除阵列

1）**storcli64.exe /c0 /vall show** 确认目标逻辑卷的 VD 值，如下图所示为 238。



2）**storcli64.exe /c0/v238 delete** 删除阵列卡 c0 下的逻辑卷 v238。



6. 创建与删除热备

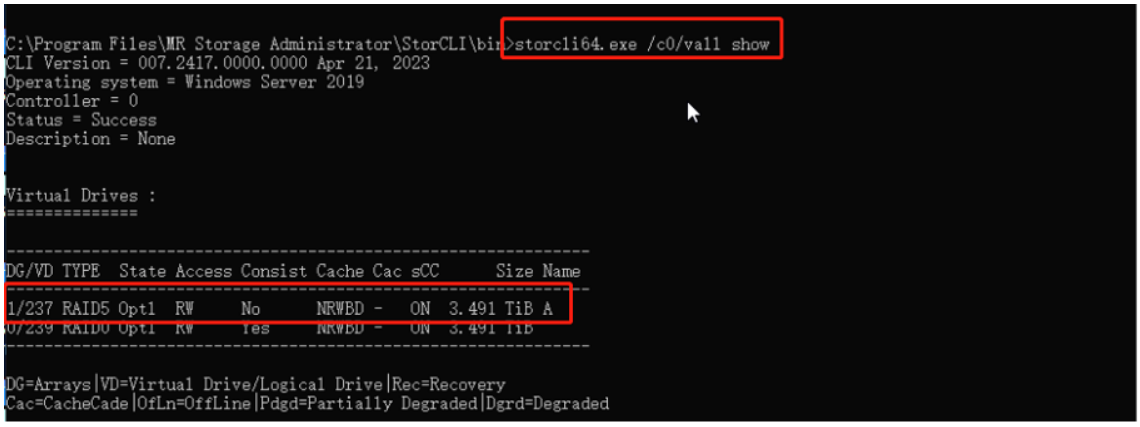
热备盘类型：

- ✓ 全局热备：热备盘为存储控制卡下所有符合要求的逻辑盘所共有，当任一逻辑盘的成员盘发生故障时，全局热备盘均可自动替代该故障盘，更换故障盘后，热备盘中的数据会回拷至新的物理盘，全局热备盘会恢复热备状态。
- ✓ 专属热备：热备盘为当前存储控制卡下多个逻辑盘所共有。当存储控制卡下的逻辑盘的成员盘发生故障时，专属热备盘会自动替代该故障盘，更换故障盘后，热备盘中的数据会回拷至新的物理盘，专属热备盘会恢复热备状态。

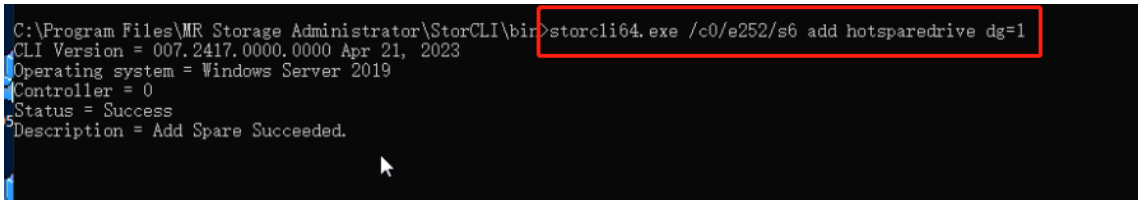
6.1 创建热备

6.1.1 创建专用热备

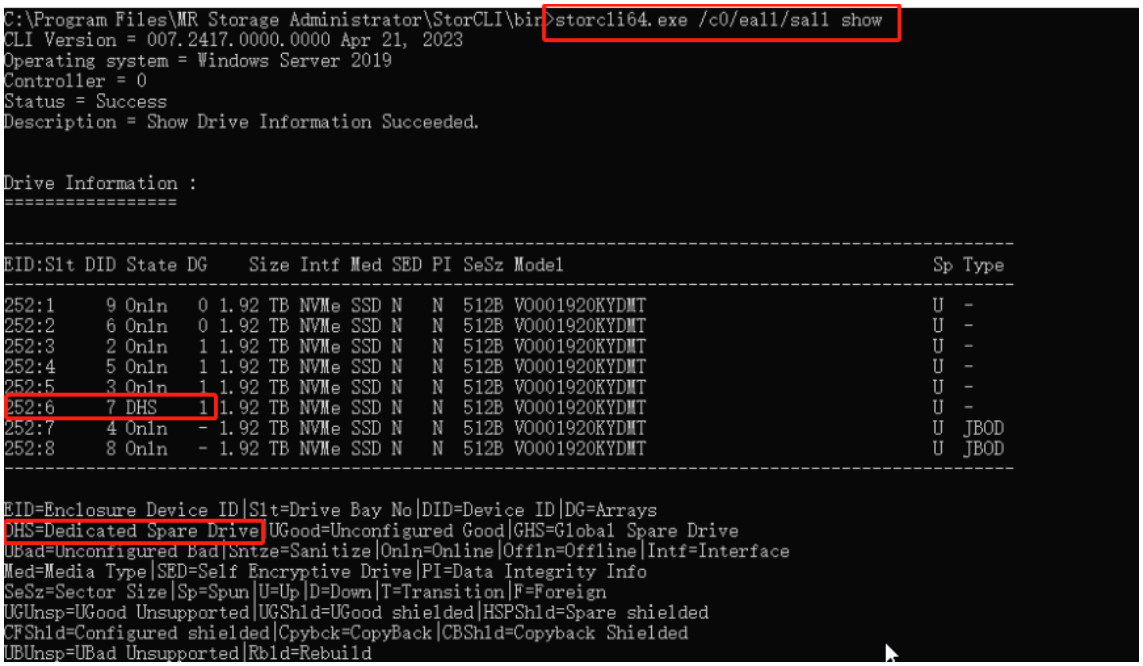
1）**storcli64.exe /c0 /vall show** 确认目标逻辑盘的 DG 信息为 1。



2）**storcli64.exe /c0/e252/s6 add hotsparedrive dgs=1** 为 DG 信息为 1 的阵列配置专属热备为 EID:Slt 信息为 252 : 6 的硬盘。



3）**storcli64.exe /c0/eall/sall show** 可看到目标硬盘的状态变为 DHS：专属热备盘。



6.1.2 创建全局热备

1）**storcli64.exe /c0/eall/sall show** 确认目标物理硬盘的 EID : Slt 信息。

```
EID:Slt DID State DG     Size Intf Med SED PI SeSz Model                                  Sp Type
252:1     9 Onln   0 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:2     6 Onln   0 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:3     2 Onln   1 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:4     5 Onln   1 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:5     3 Onln   1 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:6     7 DHS    1 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:7     4 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  JBOD
252:8     8 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  JBOD
```

2）**storcli64.exe /c0/e252/s6 add hotsparedrive 将** EID：Slt 信息为 252：6 的硬盘设置为热备盘。

```
C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe /c0/e252/s6 add hotsparedrive
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Controller = 0
Status = Success
Description = Add Spare Succeeded.
```

3）**storcli64.exe /c0 show all** 可看到物理盘状态变为 GHS（全局热备）。

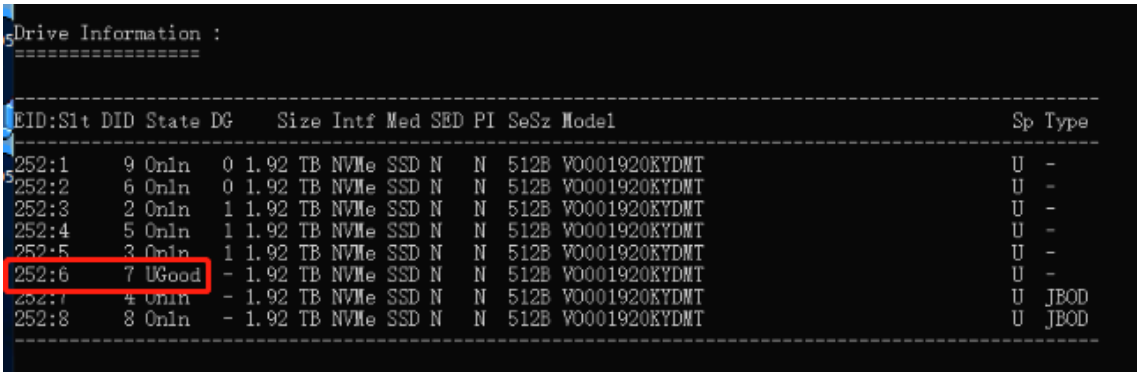
```
C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe /c0/eall/sall show
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Controller = 0
Status = Success
Description = Show Drive Information Succeeded.


Drive Information :
=================

EID:Slt DID State DG     Size Intf Med SED PI SeSz Model                                  Sp Type
252:1     9 Onln   0 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:2     6 Onln   0 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:3     2 Onln   1 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:4     5 Onln   1 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:5     3 Onln   1 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:6     7 GHS    - 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  -
252:7     4 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  JBOD
252:8     8 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDNT                          U  JBOD

EID=Enclosure Device ID|Slt=Drive Bay No|DID=Device ID|DG=Arrays
DHS=Dedicated Spare Drive|UGood=Unconfigured Good|GHS=Global Spare Drive
UBad=Unconfigured Bad|Sntze=Sanitize|Onln=Online|Offln=Offline|Intf=Interface
Med=Media Type|SED=Self Encryptive Drive|PI=Data Integrity Info
```


6.2 删除热备

1）**storcli64.exe /c0/e252/s6 delete hotsparedrive** 删除 EID：Slt 信息为 252：6 硬盘。

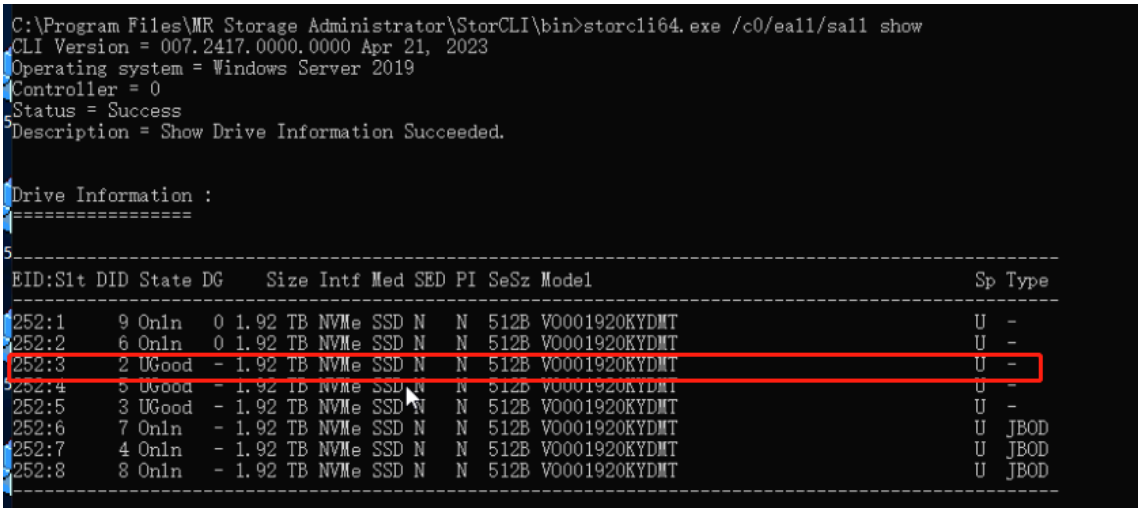
```
C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe /c0/e252/s6 delete hotsparedrive
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Controller = 0
Status = Success
Description = Delete Spare Succeeded.
```

2）**storcli64.exe /c0/eall/sall show** 查看物理盘状态变为 UGood：未配置的正常硬盘。

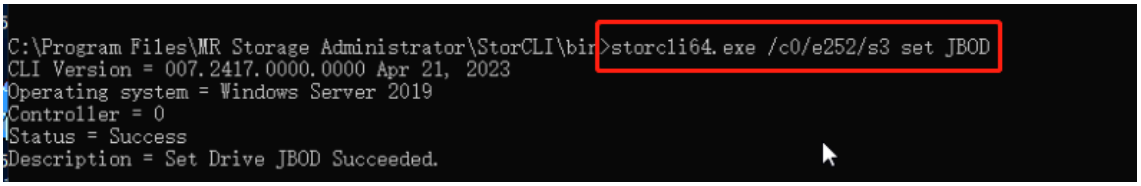


7. 设置与取消直通盘

1）**storcli64.exe /c0 show all** 确认目标硬盘 EID : Slt 信息，状态。



2）storcli64.exe /c0/e252/s3 set JBOD　将 EID : Slt 信息为 252 : 3 的硬盘设置为 JBOD 模式。



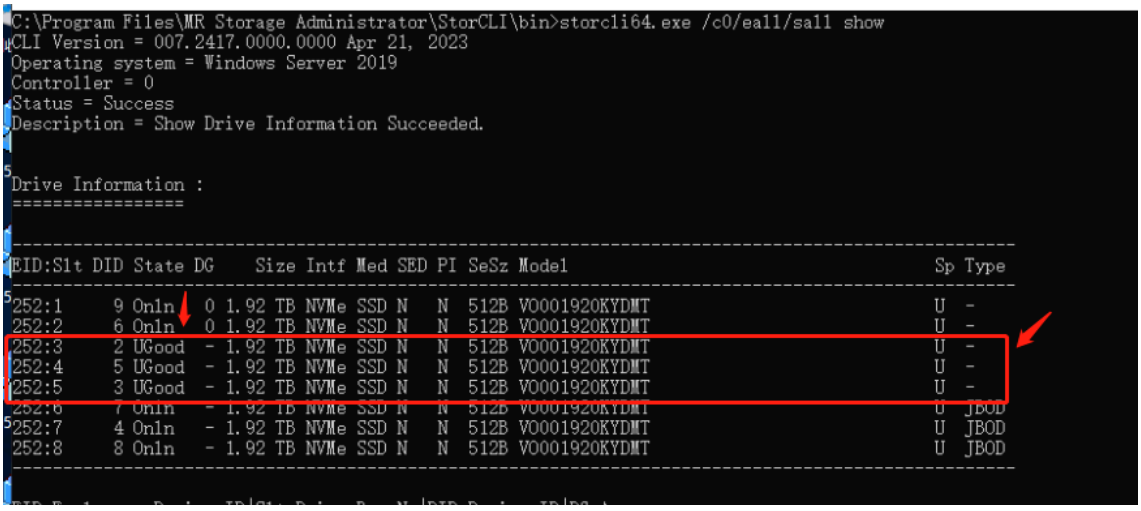
3）**storcli64.exe /c0/eall/vall show** 目标硬盘状态已成功设置为 JBOD 模式。

```
C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe /c0/eall/sall show
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Controller = 0
Status = Success
Description = Show Drive Information Succeeded.


Drive Information :
=================

-----------------------------------------------------------------------------------------------------------
EID:Slt DID State DG     Size Intf Med SED PI SeSz Model                                    Sp Type
-----------------------------------------------------------------------------------------------------------
252:1     9 Onln   0 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  -
252:2     6 Onln   0 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  -
252:3     2 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
252:4     5 UGood  - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  -
252:5     3 UGood  - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  -
252:6     7 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
252:7     4 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
252:8     8 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
-----------------------------------------------------------------------------------------------------------
```

4）**storcli64.exe /c0/e252/s3 set good** 取消 JBOD，将硬盘恢复为 UGood 状态。(此处的 e253/s3 对应硬盘的 EID：Slt)。

```
-----------------------------------------------------------------------------------------------------------
EID:Slt DID State DG     Size Intf Med SED PI SeSz Model                                    Sp Type
-----------------------------------------------------------------------------------------------------------
252:1     9 Onln   0 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  -
252:2     6 Onln   0 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  -
252:3     2 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
252:4     5 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
252:5     3 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
252:6     7 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
252:7     4 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
252:8     8 Onln   - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                            U  JBOD
-----------------------------------------------------------------------------------------------------------

C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe /c0/e252/s3 set good
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Controller = 0
Status = Success
Description = Set Drive Good Succeeded.


C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe /c0/e252/s4 set good
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Controller = 0
Status = Success
Description = Set Drive Good Succeeded.


C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe /c0/e252/s5 set good
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Controller = 0
Status = Success
Description = Set Drive Good Succeeded.
```

5）**storcli64.exe /c0/eall/vall show** 目标硬盘状态已恢复 UGood 模式。



```
C:\Program Files\MR Storage Administrator\StorCLI\bin>storcli64.exe /c0/eall/sall show
CLI Version = 007.2417.0000.0000 Apr 21, 2023
Operating system = Windows Server 2019
Controller = 0
Status = Success
Description = Show Drive Information Succeeded.


Drive Information :
=================

-----------------------------------------------------------------------------------------------------------
EID:Slt DID State DG     Size Intf Med SED PI SeSz Model                                  Sp Type
-----------------------------------------------------------------------------------------------------------
252:1     9 Onln  0 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                           U  -
252:2     6 Onln  0 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                           U  -
252:3     2 UGood - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                           U  -
252:4     5 UGood - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                           U  -
252:5     3 UGood - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                           U  -
252:6     7 Onln  - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                           U  JBOD
252:7     4 Onln  - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                           U  JBOD
252:8     8 Onln  - 1.92 TB NVMe SSD N   N  512B VO001920KYDMT                           U  JBOD
-----------------------------------------------------------------------------------------------------------
```