

----- Demystifying ASM REQUIRED\_MIRROR\_FREE\_MB and USABLE\_FILE\_MB

SQL> connect sys/oracle as sysasm

Connected.

SQL> set sqlprompt "ASM> "

----- See the available ASMLIB disks

ASM> !oracleasm listdisks

ACFS  
DATA  
JBOD01  
JBOD02  
JBOD03  
JBOD04  
JBOD05  
JBOD06  
RECO

----- See the disks inside ASM

ASM> select name,label,path,header\_status,os\_mb,free\_mb from v\$asm\_disk order by 2;

NAME	LABEL	PATH	HEADER_STATU	OS_MB	FREE_MB
ACFS	ACFS	ORCL:ACFS	MEMBER	8189	191
DATA	DATA	ORCL:DATA	MEMBER	3082	880
	JBOD01	ORCL:JBOD01	FORMER	203	0
	JBOD02	ORCL:JBOD02	FORMER	203	0
	JBOD03	ORCL:JBOD03	FORMER	203	0
	JBOD04	ORCL:JBOD04	FORMER	203	0
	JBOD05	ORCL:JBOD05	FORMER	203	0
	JBOD06	ORCL:JBOD06	FORMER	203	0
RECO	RECO	ORCL:RECO	MEMBER	5106	3905

----- or use ASMCMD

ASM> !asmcmd lsdsk --candidate

Path  
ORCL:JBOD01  
ORCL:JBOD02  
ORCL:JBOD03  
ORCL:JBOD04  
ORCL:JBOD05  
ORCL:JBOD06

----- Create an external redundancy diskgroup

ASM> create diskgroup demo external redundancy

2 disk 'ORCL:jbod01'  
3 disk 'ORCL:jbod02'  
4 disk 'ORCL:jbod03'  
5 disk 'ORCL:jbod04'  
6 attribute 'compatible.asm' = '12.1.0.0.0';

Diskgroup created.

----- See the diskgroup

ASM> select name, state, type, total\_mb, free\_mb, required\_mirror\_free\_mb req\_free,  
usable\_file\_mb use\_mb

2 from v\$asm\_diskgroup where name = 'DEMO';

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	EXTERN	812	750	0	750

----- See the disks again inside ASM

ASM> select name,label,path,header\_status,os\_mb,free\_mb

2 from v\$asm\_disk where mount\_status != 'CLOSED' order by 2;

NAME	LABEL	PATH	HEADER_STATU	OS_MB	FREE_MB
ACFS	ACFS	ORCL:ACFS	MEMBER	8189	191
DATA	DATA	ORCL:DATA	MEMBER	3082	880
JBOD01	JBOD01	ORCL:JBOD01	MEMBER	203	188
JBOD02	JBOD02	ORCL:JBOD02	MEMBER	203	188
JBOD03	JBOD03	ORCL:JBOD03	MEMBER	203	187
JBOD04	JBOD04	ORCL:JBOD04	MEMBER	203	187
RECO	RECO	ORCL:RECO	MEMBER	5106	3905

----- Create a normal redundancy diskgroup  
 ASM> drop diskgroup demo;

Diskgroup dropped.

ASM> create diskgroup demo normal redundancy  
 2 failgroup FG1 disk  
 3 'ORCL:jbod01'  
 4 failgroup FG2 disk  
 5 'ORCL:jbod02'  
 6 failgroup FG3 disk  
 7 'ORCL:jbod03'  
 8 failgroup FG4 disk  
 9 'ORCL:jbod04'  
 10 failgroup FG5 disk  
 11 'ORCL:jbod05'  
 12 failgroup FG6 disk  
 13 'ORCL:jbod06'  
 14 attribute 'compatible.asm' = '12.1.0.0.0';

Diskgroup created.

----- See the failgroup sizes

ASM> select failgroup, sum(total\_mb) from v\$asm\_disk  
 2 where label like 'JBOD%' group by failgroup order by failgroup;

FAILGROUP	SUM(TOTAL_MB)
FG1	203
FG2	203
FG3	203
FG4	203
FG5	203
FG6	203

----- See the diskgroup

ASM> select name, state, type, total\_mb, free\_mb, required\_mirror\_free\_mb req\_free,  
 usable\_file\_mb use\_mb  
 2 from v\$asm\_diskgroup where name = 'DEMO';

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	NORMAL	1218	1047	203	422

----- Why is REQUIRED\_MIRROR\_FREE\_MB equal to 203?

----- Why is USABLE\_FILE\_MB equal to 422?

ASM> select trunc((free\_mb - required\_mirror\_free\_mb) / 2) as usable  
 2 from v\$asm\_diskgroup where name='DEMO';

USABLE  
 -----  
 422

```

----- Use a bit of diskgroup space
ASM> connect sys/oracle@v121cdb as sysdba
Connected.
ASM> set sqlprompt "SQL> "
SQL> create tablespace foo datafile '+DEMO' size 150m;

```

Tablespace created.

```

SQL> connect sys/oracle as sysasm
Connected.
SQL> set sqlprompt "ASM> "
----- See the diskgroup again
ASM> select name, state, type, total_mb, free_mb, required_mirror_free_mb req_free,
usable_file_mb use_mb
  2 from v$asm_diskgroup where name = 'DEMO';

```

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	NORMAL	1218	721	203	259

```

----- Use a bit more space
ASM> connect sys/oracle@v121cdb as sysdba
Connected.
ASM> set sqlprompt "SQL> "
SQL> alter tablespace foo add datafile '+DEMO' size 150m;

```

Tablespace altered.

```

SQL> connect sys/oracle as sysasm
Connected.
SQL> set sqlprompt "ASM> "
----- See the diskgroup again
ASM> select name, state, type, total_mb, free_mb, required_mirror_free_mb req_free,
usable_file_mb use_mb
  2 from v$asm_diskgroup where name = 'DEMO';

```

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	NORMAL	1218	416	203	106

```

----- Can we allocate another 150MB?
ASM> connect sys/oracle@v121cdb as sysdba
Connected.
ASM> set sqlprompt "SQL> "
SQL> alter tablespace foo add datafile '+DEMO' size 150m;

```

Tablespace altered.

```

SQL> connect sys/oracle as sysasm
Connected.
SQL> set sqlprompt "ASM> "
----- See the diskgroup again
ASM> select name, state, type, total_mb, free_mb, required_mirror_free_mb req_free,
usable_file_mb use_mb
  2 from v$asm_diskgroup where name = 'DEMO';

```

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	NORMAL	1218	111	203	-46

```

----- or use ASMCMD
ASM> !asmcmd lsdg demo

```

```

State      Type      Rebal  Sector  Block      AU  Total_MB  Free_MB  Req_mir_free_MB
Usable_file_MB  Offline_disks  Voting_files  Name
MOUNTED  NORMAL  N          512    4096    1048576      1218      111          203
-46              0              N  DEMO/

```

```

----- Drop the tablespace
ASM> connect sys/oracle@v121cdb as sysdba
Connected.
ASM> set sqlprompt "SQL> "
SQL> drop tablespace foo;

```

Tablespace dropped.

```

SQL> connect sys/oracle as sysasm
Connected.
SQL> set sqlprompt "ASM> "
----- Create another normal redundancy diskgroup
ASM> drop diskgroup demo;

```

Diskgroup dropped.

```

ASM> create diskgroup demo normal redundancy
 2 failgroup FG1 disk
 3 'ORCL:jbod01',
 4 'ORCL:jbod02'
 5 failgroup FG2 disk
 6 'ORCL:jbod03',
 7 'ORCL:jbod04'
 8 failgroup FG3 disk
 9 'ORCL:jbod05',
10 'ORCL:jbod06'
11 attribute 'compatible.asm' = '12.1.0.0.0';

```

Diskgroup created.

```

----- See the failgroup sizes
ASM> select failgroup, sum(total_mb) from v$asm_disk
 2 where label like 'JBOD%' group by failgroup order by failgroup;

```

FAILGROUP	SUM(TOTAL_MB)
FG1	406
FG2	406
FG3	406

```

----- See the diskgroup
ASM> select name, state, type, total_mb, free_mb, required_mirror_free_mb req_free,
usable_file_mb use_mb
 2 from v$asm_diskgroup where name = 'DEMO';

```

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	NORMAL	1218	1047	406	320

```

----- Why is REQUIRED_MIRROR_FREE_MB equal to 406?
----- Why is USABLE_FILE_MB equal to 320
ASM> select trunc((free_mb - required_mirror_free_mb) / 2) as usable
 2 from v$asm_diskgroup where name='DEMO';

```

```

-----
USABLE
-----
320

```

```
----- Create yet another normal redundancy diskgroup
ASM> drop diskgroup demo;
```

Diskgroup dropped.

```
ASM> create diskgroup demo normal redundancy
 2 failgroup FG1 disk
 3 'ORCL:jbod01',
 4 'ORCL:jbod02',
 5 'ORCL:jbod03'
 6 failgroup FG2 disk
 7 'ORCL:jbod04',
 8 'ORCL:jbod05',
 9 'ORCL:jbod06'
10 attribute 'compatible.asm' = '12.1.0.0.0';
```

Diskgroup created.

```
----- See the failgroup sizes
ASM> select failgroup,sum(total_mb) from v$asm_disk
 2 where label like 'JBOD%' group by failgroup order by failgroup;
```

FAILGROUP	SUM(TOTAL_MB)
FG1	609
FG2	609

```
----- See the diskgroup
ASM> select name, state, type, total_mb, free_mb, required_mirror_free_mb req_free,
usable_file_mb use_mb
 2 from v$asm_diskgroup where name = 'DEMO';
```

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	NORMAL	1218	1098	203	447

```
----- Why is REQUIRED_MIRROR_FREE_MB equal to 203?
----- Why is USABLE_FILE_MB equal to 447?
ASM> select trunc((free_mb - required_mirror_free_mb) / 2) as usable
 2 from v$asm_diskgroup where name='DEMO';
```

USABLE
447

```
----- Create a high redundancy diskgroup
ASM> drop diskgroup demo;
```

Diskgroup dropped.

```
ASM> create diskgroup demo high redundancy
 2 failgroup FG1 disk
 3 'ORCL:jbod01'
 4 failgroup FG2 disk
 5 'ORCL:jbod02'
 6 failgroup FG3 disk
 7 'ORCL:jbod03'
 8 failgroup FG4 disk
 9 'ORCL:jbod04'
10 failgroup FG5 disk
11 'ORCL:jbod05'
12 failgroup FG6 disk
13 'ORCL:jbod06'
```

```
14 attribute 'compatible.asm' = '12.1.0.0.0';
```

Diskgroup created.

```
----- See the failgroup sizes
```

```
ASM> select failgroup,sum(total_mb) from v$asm_disk
  2 where label like 'JBOD%' group by failgroup order by failgroup;
```

FAILGROUP	SUM(TOTAL_MB)
FG1	203
FG2	203
FG3	203
FG4	203
FG5	203
FG6	203

```
----- See the diskgroup
```

```
ASM> select name, state, type, total_mb, free_mb, required_mirror_free_mb req_free,
usable_file_mb use_mb
  2 from v$asm_diskgroup where name = 'DEMO';
```

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	HIGH	1218	1047	406	213

```
----- Why is REQUIRED_MIRROR_FREE_MB equal to 406?
```

```
----- Why is USABLE_FILE_MB equal to 213
```

```
ASM> select trunc((free_mb - required_mirror_free_mb) / 3) as usable
  2 from v$asm_diskgroup where name='DEMO';
```

```
USABLE
```

```
-----
213
```

```
----- Create another high redundancy diskgroup
```

```
ASM> drop diskgroup demo;
```

Diskgroup dropped.

```
ASM> create diskgroup demo high redundancy
```

```
  2 failgroup FG1 disk
  3 'ORCL:jbod01',
  4 'ORCL:jbod02'
  5 failgroup FG2 disk
  6 'ORCL:jbod03',
  7 'ORCL:jbod04'
  8 failgroup FG3 disk
  9 'ORCL:jbod05',
 10 'ORCL:jbod06'
 11 attribute 'compatible.asm' = '12.1.0.0.0';
```

Diskgroup created.

```
----- See the failgroup sizes
```

```
ASM> select failgroup,sum(total_mb) from v$asm_disk
  2 where label like 'JBOD%' group by failgroup order by failgroup;
```

FAILGROUP	SUM(TOTAL_MB)
FG1	406
FG2	406
FG3	406

----- See the diskgroup

```
ASM> select name, state, type, total_mb, free_mb, required_mirror_free_mb req_free,
usable_file_mb use_mb
  2 from v$asm_diskgroup where name = 'DEMO';
```

NAME	STATE	TYPE	TOTAL_MB	FREE_MB	REQ_FREE	USE_MB
DEMO	MOUNTED	HIGH	1218	1047	406	213

----- Why is REQUIRED\_MIRROR\_FREE\_MB equal to 406?

----- Why is USABLE\_FILE\_MB equal to 213?

```
ASM> select trunc((free_mb - required_mirror_free_mb) / 3) as usable
  2 from v$asm_diskgroup where name='DEMO';
```

```
USABLE
-----
  213
```