**ASM元数据备份与恢复:md\_backup和md\_restore**

[**1**](http://www.wumii.com/item/brsMQziF)

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 链接：<http://www.eygle.com/archives/2011/03/asm_md_backup_md_restore.html>

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在Oracle Database 11gR2 中，asmcmd有了大量的改进和增强，即使11.2.0.2和11.2.0.1比较，也有很多不同。  
  
 在ASM元数据的备份与恢复方面，Oracle增加了两个命令：md\_backup 和 md\_restore。  
 md 是 metadata的缩写，这一工具极大的简化了ASM的元数据维护。  
  
 在asmcmd中，通过help md\_backup可以看到详细的命令提示：

ASMCMD> help md\_backup  
         md\_backup  
  
         The md\_backup command creates a backup file containing metadata  
         for one or more disk groups.  
         Volume and Oracle Automatic Storage Management Cluster File System  
         (Oracle ACFS) file system information is not backed up.  
  
         md\_backup backup\_file [-G diskgroup [,diskgroup,...]]  
  
         The options for the md\_backup command are described below.  
  
         backup\_file     - Specifies the backup file in which you want to  
                           store the metadata.  
         -G diskgroup    - Specifies the disk group name of the disk group  
                           that must be backed up  
  
         By default all the mounted disk groups are included in the backup file,  
         which is saved in the current working directory.  
  
         The first example shows the use of the backup command when you run it  
         without options. This example backs up all of the mounted disk groups  
         and creates the backup image in the current working directory. The  
         second example creates a backup of disk group DATA and FRA. The backup  
         that this example creates is saved in the /tmp/dgbackup20090714 file.  
  
         ASMCMD [+] > md\_backup /tmp/dgbackup20090716  
         ASMCMD [+] > md\_backup /tmp/dgbackup20090716 -G DATA,FRA  
         Disk group metadata to be backed up: DATA  
         Disk group metadata to be backed up: FRA  
         Current alias directory path: ASM/ASMPARAMETERFILE  
         Current alias directory path: ORCL/DATAFILE  
         Current alias directory path: ORCL/TEMPFILE  
         Current alias directory path: ORCL/CONTROLFILE  
         Current alias directory path: ORCL/PARAMETERFILE  
         Current alias directory path: ASM  
         Current alias directory path: ORCL/ONLINELOG  
         Current alias directory path: ORCL  
         Current alias directory path: ORCL/CONTROLFILE  
         Current alias directory path: ORCL/ARCHIVELOG/2009\_07\_13  
         Current alias directory path: ORCL/BACKUPSET/2009\_07\_14  
         Current alias directory path: ORCL/ARCHIVELOG/2009\_07\_14  
         Current alias directory path: ORCL  
         Current alias directory path: ORCL/DATAFILE  
         Current alias directory path: ORCL/ARCHIVELOG  
         Current alias directory path: ORCL/BACKUPSET  
         Current alias directory path: ORCL/ONLINELOG

现在backup\_file是一个需要强制制定的参数，以下命令备份了ASM中所有的磁盘组元数据：

ASMCMD> md\_backup /tmp/oradgbackup20110322  
 Disk group metadata to be backed up: ACFSG  
 Disk group metadata to be backed up: CRSDG  
 Disk group metadata to be backed up: ORADG  
 Current alias directory path: EYGLE/ONLINELOG  
 Current alias directory path: EYGLE  
 Current alias directory path: EYGLE/CONTROLFILE  
 Current alias directory path: ASM  
 Current alias directory path: EYGLE/PARAMETERFILE  
 Current alias directory path: EYGLE/CONTROLFILE  
 Current alias directory path: EYGLE/TEMPFILE  
 Current alias directory path: EYGLE/DATAFILE  
 Current alias directory path: EYGLE  
 Current alias directory path: EYGLE/ONLINELOG  
 Current alias directory path: ASM/ASMPARAMETERFILE

也可以制定备份特定的磁盘组信息：

ASMCMD> md\_backup /tmp/oradgbackup20110323 -G ORADG  
 Disk group metadata to be backed up: ORADG

备份以文本格式记录了磁盘组的参数信息：

[grid@enmou1 ~]$ more /tmp/oradgbackup20110323  
 @diskgroup\_set = (  
                    {  
                      'ATTRINFO' => {  
                                      '\_.\_DIRVERSION' => '11.2.0.0.0',  
                                      'COMPATIBLE.ASM' => '11.2.0.0.0',  
                                      'COMPATIBLE.RDBMS' => '10.1.0.0.0'  
                                    },  
                      'DISKSINFO' => {  
                                       'VOL3' => {  
                                                   'VOL3' => {  
                                                               'TOTAL\_MB' => '9687',  
                                                               'FAILGROUP' => 'VOL3',  
                                                               'NAME' => 'VOL3',  
                                                               'DGNAME' => 'ORADG',  
                                                               'PATH' => 'ORCL:VOL3'  
                                                             }  
                                                 }  
                                     },  
                      'DGINFO' => {  
                                    'DGTORESTORE' => 0,  
                                    'DGCOMPAT' => '11.2.0.0.0',  
                                    'DGNAME' => 'ORADG',  
                                    'DGDBCOMPAT' => '10.1.0.0.0',  
                                    'DGTYPE' => 'EXTERN',  
                                    'DGAUSZ' => '1048576'  
                                  },  
                      'ALIASINFO' => {},  
                      'TEMPLATEINFO' => {  
                                          '6' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'ONLINELOG',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '11' => {  
                                                    'DGNAME' => 'ORADG',  
                                                    'STRIPE' => 'COARSE',  
                                                    'TEMPNAME' => 'AUTOBACKUP',  
                                                    'REDUNDANCY' => 'UNPROT',  
                                                    'SYSTEM' => 'Y'  
                                                  },  
                                          '3' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'FINE',  
                                                   'TEMPNAME' => 'CONTROLFILE',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '7' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'DATAGUARDCONFIG',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '9' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'CHANGETRACKING',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '12' => {  
                                                    'DGNAME' => 'ORADG',  
                                                    'STRIPE' => 'COARSE',  
                                                    'TEMPNAME' => 'BACKUPSET',  
                                                    'REDUNDANCY' => 'UNPROT',  
                                                    'SYSTEM' => 'Y'  
                                                  },  
                                          '2' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'DUMPSET',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '14' => {  
                                                    'DGNAME' => 'ORADG',  
                                                    'STRIPE' => 'COARSE',  
                                                    'TEMPNAME' => 'DATAFILE',  
                                                    'REDUNDANCY' => 'UNPROT',  
                                                    'SYSTEM' => 'Y'  
                                                  },  
                                          '15' => {  
                                                    'DGNAME' => 'ORADG',  
                                                    'STRIPE' => 'COARSE',  
                                                    'TEMPNAME' => 'ASMPARAMETERFILE',  
                                                    'REDUNDANCY' => 'UNPROT',  
                                                    'SYSTEM' => 'Y'  
                                                  },  
                                          '8' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'FLASHBACK',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '4' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'FLASHFILE',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '1' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'OCRFILE',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '0' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'PARAMETERFILE',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 },  
                                          '10' => {  
                                                    'DGNAME' => 'ORADG',  
                                                    'STRIPE' => 'COARSE',  
                                                    'TEMPNAME' => 'XTRANSPORT',  
                                                    'REDUNDANCY' => 'UNPROT',  
                                                    'SYSTEM' => 'Y'  
                                                  },  
                                          '13' => {  
                                                    'DGNAME' => 'ORADG',  
                                                    'STRIPE' => 'COARSE',  
                                                    'TEMPNAME' => 'TEMPFILE',  
                                                    'REDUNDANCY' => 'UNPROT',  
                                                    'SYSTEM' => 'Y'  
                                                  },  
                                          '5' => {  
                                                   'DGNAME' => 'ORADG',  
                                                   'STRIPE' => 'COARSE',  
                                                   'TEMPNAME' => 'ARCHIVELOG',  
                                                   'REDUNDANCY' => 'UNPROT',  
                                                   'SYSTEM' => 'Y'  
                                                 }  
                                        }  
                    }  
                  );

通过这些信息，就可以在磁盘组损坏时，快速恢复ASM的元数据。  
 恢复在磁盘组可用状态下不允许执行：

ASMCMD> md\_restore --full -G oradg /tmp/oradgbackup20110323  
 Current Diskgroup metadata being restored: ORADG  
 ASMCMD-09352: CREATE DISKGROUP failed  
 ORA-15018: diskgroup cannot be created  
 ORA-15030: diskgroup name "ORADG" is in use by another diskgroup (DBD ERROR: OCIStmtExecute)

以下是在DROP了ORADG之后，执行恢复的全过程，恢复完成以后，磁盘组被创建，模板信息被还原：

ASMCMD> md\_restore --full -G oradg /tmp/oradgbackup20110323  
 Current Diskgroup metadata being restored: ORADG  
 Diskgroup ORADG created!  
 System template ONLINELOG modified!  
 System template AUTOBACKUP modified!  
 System template CONTROLFILE modified!  
 System template DATAGUARDCONFIG modified!  
 System template CHANGETRACKING modified!  
 System template DUMPSET modified!  
 System template BACKUPSET modified!  
 System template ASMPARAMETERFILE modified!  
 System template DATAFILE modified!  
 System template FLASHBACK modified!  
 System template OCRFILE modified!  
 System template FLASHFILE modified!  
 System template PARAMETERFILE modified!  
 System template TEMPFILE modified!  
 System template XTRANSPORT modified!  
 System template ARCHIVELOG modified!

通过-S参数可以仅生成恢复脚本，不执行恢复动作：

ASMCMD> md\_restore -S create\_oradg.sql /tmp/oradgbackup20110323  
 Current Diskgroup metadata being restored: ORADG

以下是ORADG磁盘组恢复时执行的命令：

[grid@enmou1 ~]$ more create\_oradg.sql  
 create diskgroup ORADG EXTERNAL redundancy  disk 'ORCL:VOL3' name VOL3 size 9687M attribute 'compatible.asm' = '11.2.0.0.0', 'compatible.r  
 dbms' = '10.1.0.0.0';  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG set attribute '\_.\_DIRVERSION' = '11.2.0.0.0';  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template ONLINELOG attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template AUTOBACKUP attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template CONTROLFILE attributes (UNPROTECTED FINE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template DATAGUARDCONFIG attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template CHANGETRACKING attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template DUMPSET attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template BACKUPSET attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template ASMPARAMETERFILE attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template DATAFILE attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template FLASHBACK attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template OCRFILE attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template FLASHFILE attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template PARAMETERFILE attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template TEMPFILE attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template XTRANSPORT attributes (UNPROTECTED COARSE);  
 alter diskgroup /\*ASMCMD AMBR\*/ORADG alter template ARCHIVELOG attributes (UNPROTECTED COARSE);

ASMCMD的新增命令极多，以下是命令列表：

ASMCMD> help  
  
             asmcmd [-V] [-v <errors|warnings|normal|info|debug>] [--privilege <sysasm|sysdba>] [-p] [command]  
 asmcmd\_no\_conn\_str  
  
         Starts asmcmd or executes the command  
  
         asmcmd [-V] [-v <errors|warnings|normal|info|debug>] [--privilege <sysasm|sysdba>] [-p] [command]  
  
         The environment variables ORACLE\_HOME and ORACLE\_SID determine the  
         instance to which the program connects, and ASMCMD establishes a  
         bequeath connection to it, in the same manner as a SQLPLUS / AS  
         SYSASM.  The user must be a member of the OSASM group.  
  
         Specifying the -V option prints the asmcmd version number and  
         exits immediately.  
  
         Specifying the -v option prints extra information that can help  
         advanced users diagnose problems.  
  
         Specify the --privilege option to choose the type of connection. There are  
         only two possibilities: connecting as SYSASM or as SYSDBA.  
         The default value if this option is unspecified is SYSASM.  
  
         Specifying the -p option allows the current directory to be displayed  
         in the command prompt, like so:  
  
         ASMCMD [+DATA/ORCL/CONTROLFILE] >  
  
         [command] specifies one of the following commands, along with its  
         parameters.  
  
         Type "help [command]" to get help on a specific ASMCMD command.';  
  
         commands:  
         --------  
  
         md\_backup, md\_restore  
  
         lsattr, setattr  
  
         cd, cp, du, find, help, ls, lsct, lsdg, lsof, mkalias  
         mkdir, pwd, rm, rmalias  
  
         chdg, chkdg, dropdg, iostat, lsdsk, lsod, mkdg, mount  
         offline, online, rebal, remap, umount  
  
         dsget, dsset, lsop, shutdown, spbackup, spcopy, spget  
         spmove, spset, startup  
  
         chtmpl, lstmpl, mktmpl, rmtmpl  
  
         chgrp, chmod, chown, groups, grpmod, lsgrp, lspwusr, lsusr  
         mkgrp, mkusr, orapwusr, passwd, rmgrp, rmusr  
  
         volcreate, voldelete, voldisable, volenable, volinfo

        volresize, volset, volstat