TTS 11.0 COOKBOOK

(NSD RDBMS1 DAY05)

版本编号 11.0

2019-06

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NSD RDBMS1 DAY05

1. 案例 1：数据完全备份与恢复

- **问题**

  - 安装 percona 软件包
  - 备份所有数据到/allbak 目录下
  - 搭建新的数据库服务器，使用备份文件恢复数据
  - 验证数据恢复

- **步骤**

实现此案例需要按照如下步骤进行。

步骤一：安装 XtraBackup 软件包

1）安装软件

```
[root@host50 ~]# rpm -ivh libev-4.15-1.el6.rf.x86_64.rpm
[root@host50 ~]# yum -y  install percona-xtrabackup-24-2.4.7-1.el7.x86_64.rpm
警告：percona-xtrabackup-24-2.4.6-2.el7.x86_64.rpm: 头 V4 DSA/SHA1 Signature，密钥
ID cd2efd2a: NOKEY
准备中...                          ################################# [100%]
正在升级/安装...
   1:percona-xtrabackup-24-2.4.6-2.el7################################# [ 33%]
   2:percona-xtrabackup-test-24-2.4.6-################################# [ 67%]
   3:percona-xtrabackup-24-debuginfo-2################################# [100%]
```

2）确认安装的主要程序/脚本

```
[root@host50 ~]# rpm -qa  | grep -i percona
percona-xtrabackup-24-2.4.7-1.el7.x86_64

[root@host50 ~]# rpm -ql percona-xtrabackup-24
/usr/bin/innobackupex
/usr/bin/xbcloud
/usr/bin/xbcloud_osenv
/usr/bin/xbcrypt
/usr/bin/xbstream
/usr/bin/xtrabackup
/usr/share/doc/percona-xtrabackup-24-2.4.7
/usr/share/doc/percona-xtrabackup-24-2.4.7/COPYING
/usr/share/man/man1/innobackupex.1.gz
/usr/share/man/man1/xbcrypt.1.gz
/usr/share/man/man1/xbstream.1.gz
/usr/share/man/man1/xtrabackup.1.gz
[root@host50 ~]#
```

```
[root@host50 ~]# innobackupex --help  //查看简单帮助
[root@host50 ~]#
[root@host50 ~]# man  innobackupex //查看详细帮助



/usr/share/man/man1/xtrabackup.1.gz
```

步骤二：备份所有数据到/allbak 目录下

1）备份所有数据

```
[root@host50 ~]# innobackupex --user root --password 123456 /allbak --no-timestamp
//执行备份命令
170425 11:05:44 innobackupex: Starting the backup operation

IMPORTANT: Please check that the backup run completes successfully.
           At the end of a successful backup run innobackupex
           prints "completed OK!".

Unrecognized character \x01; marked by <-- HERE after <-- HERE near column 1 at -
line 1374.
170425 11:05:45 Connecting to MySQL server host: localhost, user: root, password:
set, port: not set, socket: not set
Using server version 5.7.17
innobackupex version 2.4.6 based on MySQL server 5.7.13 Linux (x86_64) (revision id:
8ec05b7)
xtrabackup: uses posix_fadvise().
xtrabackup: cd to /var/lib/mysql
xtrabackup: open files limit requested 0, set to 1024
xtrabackup: using the following InnoDB configuration:
xtrabackup:   innodb_data_home_dir = .
xtrabackup:   innodb_data_file_path = ibdata1:12M:autoextend
xtrabackup:   innodb_log_group_home_dir = ./
xtrabackup:   innodb_log_files_in_group = 2
xtrabackup:   innodb_log_file_size = 50331648
InnoDB: Number of pools: 1
170425 11:05:45 >> log scanned up to (2543893)
xtrabackup: Generating a list of tablespaces
InnoDB: Allocated tablespace ID 2 for mysql/plugin, old maximum was 0
170425 11:05:45 [01] Copying ./ibdata1 to /backup/ibdata1
170425 11:05:45 [01]        ...done
170425 11:05:46 [01] Copying ./mysql/plugin.ibd to /backup/mysql/plugin.ibd
170425 11:05:46 [01]        ...done
170425 11:05:46 [01] Copying ./mysql/servers.ibd to /backup/mysql/servers.ibd
170425 11:05:46 [01]        ...done
170425 11:05:46 [01] Copying ./mysql/help_topic.ibd to /backup/mysql/help_topic.ibd
170425 11:05:46 [01]        ...done
170425 11:05:46 >> log scanned up to (2543893)
.. ..
170425  11:06:00  [01]  Copying  ./sys/x@0024waits_global_by_latency.frm  to
/backup/sys/x@0024waits_global_by_latency.frm
170425 11:06:00 [01]        ...done
170425     11:06:00     [01]     Copying     ./sys/session_ssl_status.frm     to
/backup/sys/session_ssl_status.frm
170425 11:06:00 [01]        ...done
170425 11:06:00 [01] Copying ./db1/db.opt to /backup/db1/db.opt
170425 11:06:00 [01]        ...done
170425 11:06:00 [01] Copying ./db1/tb1.frm to /backup/db1/tb1.frm
170425 11:06:00 [01]        ...done
170425 11:06:00 Finished backing up non-InnoDB tables and files
170425 11:06:00 Executing FLUSH NO_WRITE_TO_BINLOG ENGINE LOGS...
xtrabackup: The latest check point (for incremental): '2543884'
```

```
    xtrabackup: Stopping log copying thread.
    .170425 11:06:00 >> log scanned up to (2543893)

    170425 11:06:00 Executing UNLOCK TABLES
    170425 11:06:00 All tables unlocked
    170425 11:06:00 [00] Copying ib_buffer_pool to /backup/ib_buffer_pool
    170425 11:06:00 [00]        ...done
    170425 11:06:00 Backup created in directory '/backup/'
    170425 11:06:00 [00] Writing backup-my.cnf
    170425 11:06:00 [00]        ...done
    170425 11:06:00 [00] Writing xtrabackup_info
    170425 11:06:00 [00]        ...done
    xtrabackup: Transaction log of lsn (2543884) to (2543893) was copied.
    170425 11:06:01 completed OK
```

2）确认备份好的文件数据：

```
    [root@host50 ~]# ls /allbak
    backup-my.cnf  ib_buffer_pool  mysql      sys                 xtrabackup_info
    db1  ibdata1      performance_schema  xtrabackup_checkpoints  xtrabackup_logfile
```

3）把备份文件传递给 目标服务器 51

```
    [root@host50 ~]#
    [root@host50 ~]# scp -r /allbak root@192.168.4.51:/root/
    [root@host50 ~]#
```

步骤三：在 51 主机，使用备份文件恢复数据

1）安装软件包，提供恢复命令

```
    [root@host51 ~]#  rpm -ivh  libev-4.15-1.el6.rf.x86_64.rpm
    [root@host51 ~]# yum -y  install percona-xtrabackup-24-2.4.7-1.el7.x86_64.rpm
```

2）恢复数据

```
    [root@host51 ~]# systemctl  stop mysqld
    [root@host51 ~]# ls /var/lib/mysql
    [root@host51 ~]# rm -rf /var/lib/mysql/* //清空数据

    [root@host51 ~]#innobackupex--apply-log  --redo-only /root/allbak //恢复数据

    170425 11:42:19 innobackupex: Starting the apply-log operation

    IMPORTANT: Please check that the apply-log run completes successfully.
               At the end of a successful apply-log run innobackupex
               prints "completed OK!".

    innobackupex version 2.4.6 based on MySQL server 5.7.13 Linux (x86_64) (revision id:
8ec05b7)
    xtrabackup: cd to /backup/
    xtrabackup: This target seems to be already prepared.
    InnoDB: Number of pools: 1
    xtrabackup: notice: xtrabackup_logfile was already used to '--prepare'.
    xtrabackup: using the following InnoDB configuration for recovery:
    xtrabackup:   innodb_data_home_dir = .
    xtrabackup:   innodb_data_file_path = ibdata1:12M:autoextend
    xtrabackup:   innodb_log_group_home_dir = .
    xtrabackup:   innodb_log_files_in_group = 2
```

```
    xtrabackup:   innodb_log_file_size = 50331648
    xtrabackup: using the following InnoDB configuration for recovery:
    xtrabackup:   innodb_data_home_dir = .
    xtrabackup:   innodb_data_file_path = ibdata1:12M:autoextend
    xtrabackup:   innodb_log_group_home_dir = .
    xtrabackup:   innodb_log_files_in_group = 2
    xtrabackup:   innodb_log_file_size = 50331648
    xtrabackup: Starting InnoDB instance for recovery.
    xtrabackup: Using 104857600 bytes for buffer pool (set by --use-memory parameter)
    InnoDB: PUNCH HOLE support available
    InnoDB: Mutexes and rw_locks use GCC atomic builtins
    InnoDB: Uses event mutexes
    InnoDB: GCC builtin __atomic_thread_fence() is used for memory barrier
    InnoDB: Compressed tables use zlib 1.2.7
    InnoDB: Number of pools: 1
    InnoDB: Not using CPU crc32 instructions
    InnoDB: Initializing buffer pool, total size = 100M, instances = 1, chunk size = 100M
    InnoDB: Completed initialization of buffer pool
    InnoDB: page_cleaner coordinator priority: -20
    InnoDB: Highest supported file format is Barracuda.

    xtrabackup: starting shutdown with innodb_fast_shutdown = 1
    InnoDB: Starting shutdown...
    InnoDB: Shutdown completed; log sequence number 2544177
    InnoDB: Number of pools: 1
    170425 11:42:20 completed OK!

    [root@host51 ~]#
    [root@host51 ~]#  innobackupex --copy-back /root/allbak //拷贝数据
    170425 11:42:55 innobackupex: Starting the apply-log operation
    IMPORTANT: Please check that the apply-log run completes successfully.
               At the end of a successful apply-log run innobackupex
               prints "completed OK!".
    innobackupex version 2.4.6 based on MySQL server 5.7.13 Linux (x86_64) (revision id:
8ec05b7)
    incremental backup from 2543884 is enabled.
    xtrabackup: cd to /backup/
    xtrabackup: This target seems to be already prepared with --apply-log-only.
    InnoDB: Number of pools: 1
    xtrabackup: xtrabackup_logfile detected: size=8388608, start_lsn=(2549924)
    xtrabackup: using the following InnoDB configuration for recovery:
    xtrabackup:   innodb_data_home_dir = .
    xtrabackup:   innodb_data_file_path = ibdata1:12M:autoextend
    xtrabackup:   innodb_log_group_home_dir = /incr01/
    xtrabackup:   innodb_log_files_in_group = 1
    xtrabackup:   innodb_log_file_size = 8388608
    xtrabackup: Generating a list of tablespaces
    InnoDB: Allocated tablespace ID 2 for mysql/plugin, old maximum was 0
    xtrabackup: page size for /incr01//ibdata1.delta is 16384 bytes
    Applying /incr01//ibdata1.delta to ./ibdata1...
    ... ...
    170425   11:43:09   [01]   Copying   /incr01/performance_schema/global_status.frm
to ./performance_schema/global_status.frm
    170425 11:43:09 [01]       ...done
    170425   11:43:09   [01]   Copying   /incr01/performance_schema/session_status.frm
to ./performance_schema/session_status.frm
    170425 11:43:09 [01]       ...done
    170425 11:43:09 [00] Copying /incr01//xtrabackup_info to ./xtrabackup_info
    170425 11:43:09 [00]       ...done
    170425 11:43:10 completed OK!

    [root@host50 ~]# chown  -R mysql:mysql /var/lib/mysql //修改所有者与组
```

步骤四：验证数据恢复

1）启动服务

```
[root@host51 ~]# systemctl  start mysqld

[root@host51 ~]# mysql -uroot -p123456
mysql> show databases;
mysql> select * from db3.user2;
mysql>select count(*) from db3.user;
mysql>
```

2）查看数据

```
[root@host51 ~]# mysql -uroot -p123456
mysql> show databases;
mysql> select * from db3.user2;
mysql> select count(*) from db3.user;
```

2. 案例 2：恢复单张表

- **问题**
  - 执行删除数据命令
  - 使用备份目录/allbak　恢复表数据
  - 验证数据恢复

- **步骤**

实现此案例需要按照如下步骤进行。

步骤一：安装 XtraBackup 软件包

1）执行删除数据命令

```
[root@host50 ~]# mysql -uroot  -p123456
mysql> delete from db3.user2; //误删除数据操作
mysql>
```

2）删除表空间

```
mysql> alter table db3.user2 discard  tablespace;
```

3）导出表信息

```
[root@host50 ~ ]# innobackupex --apply-log --export  /allbak
```

4）拷贝表信息文件到数据库目录下

```
 [root@host50 ~]# cp /allbak/db3/user2.{cfg,exp,ibd} /var/lib/mysql/db3/
```

5）修改表信息文件的所有者及组用户为 mysql

```
[root@host50 ~]# chown mysql:mysql /var/lib/mysql/db3/user2.*
```

6）导入表空间

```
mysql> alter  table db3.user2   import  tablespace;
```

7）删除数据库目录下的表信息文件

```
[root@host50 ~]# rm -rf /var/lib/mysql/db3/user2.cfg
[root@host50 ~]# rm -rf /var/lib/mysql/db3/user2.exp
```

8）查看表记录

```
mysql> select  * from db3.user2;
```

3. 案例 3：增量备份与恢复

- **问题**
  - 具体要求如下：
  - 备份所有数据
  - 备份新产生的数据
  - 删除数据
  - 使用备份文件恢复数据

- **步骤**

实现此案例需要按照如下步骤进行。

步骤一：备份所有数据，在 50 主机执行

1）完全备份 （备份所有数据到/fullbak 目录）

```
[root@host50 ~]# innobackupex --user root --password 123456  /fullbak --no-timestamp
```

步骤二：增量备份 （每次执行备份，值备份新数据，在 50 主机执行）

1）插入新记录，并做增量备份

```
mysql> insert into db3.user2 values(5,"jack");// 插入新记录,多写几条

[root@host50 ~]# innobackupex --user root --password 123456 --incremental /new1dir
--incremental-basedir=/fullbak  --no-timestamp //第 1 次增量备份 ，数据存储目录/new1dir
```

2）插入新记录，并做增量备份

```
mysql> insert into db3.user2 values(6,"jack");// 插入新记录,多写几条

[root@host50 ~]# innobackupex --user root --password 123456 --incremental /new2dir
--incremental-basedir=/newdir1  --no-timestamp //第 2 次增量备份 ，数据存储目录/new2dir
```

3）把备份文件拷贝给目标主机 51

```
[root@host50 ~]# scp -r /fullbak  root@192.168.4.51:/root/
[root@host50 ~]# scp -r /new1dir/  root@192.168.4.51:/root/
[root@host50 ~]# scp -r /new2dir/  root@192.168.4.51:/root/
```

步骤三：在主机 51 恢复数据

1）停止服务，并清空数据

```
[root@host51 ~]# systemctl  stop  mysqld
[root@host51 ~]# rm -rf /var/lib/mysql/*
```

2）合并日志

```
[root@host51 ~ ]# innobackupex --apply-log --redo-only /root/fullbak //准备恢复数
据

[root@host51 ~ ]# innobackupex --apply-log --redo-only /root/fullbak
--incremental-dir=/root/new1dir  //合并日志

[root@host51 ~ ]# innobackupex --apply-log --redo-only /root/fullbak
--incremental-dir=/root/new2dir //合并日志

 [root@host51 ~ ]# rm -rf  /root/new2dir  //恢复后，可以删除了
 [root@host51 ~ ]# rm -rf  /root/new1dir  //恢复后，可以删除了
```

3）恢复数据

```
[root@host51 ~ ]# innobackupex --copy-back /root/fullbak   //拷贝文件到数据库目录下
[root@host51 ~ ]# chown  -R mysql:mysql /var/lib/mysql //修改所有者与组用户
[root@host51 ~ ]# systemctl  start mysqld //启动服务
[root@host51 ~ ]# mysql -uroot -p123456 //登录
mysql> select  count(*)  from db3.user; //查看数据
```