Xtrabackup in a nutshell

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- **FromDual provides neutral and independent:**

  - **Consulting for MySQL**

  - **Support for MySQL and Galera**

  - **Remote-DBA Services**

  - **MySQL Training**

- **Consulting partner of the Open Database Alliance (ODBA.org)**

- **Oracle Silver Partner (OPN)**
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Full Database Backup

Full Database Backup

- ## Create the backup files:

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--no-timestamp /path/to/BACKUP-DIR/full-backup

innobackupex: completed OK!
```

- "xtrabackup-checkpoints" file contents:

  - backup_type = full-backuped

  - from_lsn = 0

  - to_lsn = 3768762

Full Database Backup

- **Prepare the backed up files:**

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
-apply-log /path/to/BACKUP-DIR/full-backup

innobackupex: completed OK!
```

- To accelerate the backup preparation: "--use-memory=??G".

- Ready to be restored.

Full Database Backup

- ## Restore the full backup:

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--copy-back /path/to/BACKUP-DIR/full-backup

innobackupex: completed OK!
```

OR

```
$shell> mv /path/to/BACKUP-DIR/full-backup /var/lib/mysql
```

Then, assign the right permissions to mysql user:

```
$shell> chown -R mysql:mysql /var/lib/mysql
```

Full Database Backup

- ## Advantages:

  - Fast & easy.

  - Simple way to introduce new slave to the master.

  - All Xtrabackup features supported.

- ## Disadvantages:

  - Datadir contents should be completely replaced.

  - Extracting one table or one database from the full backup is not possible.

Full Database Backup

- ## Important hints:

  - Xtrabackup creates the backup folder.

  - ib_logfile files size (Source & Destination).

  - The MySQL user privileges:

    - RELOAD

    - LOCK TABLES

    - REPLICATION CLIENT

Incremental Database Backup

Incremental Database Backup

- ## Create the base backup:

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--no-timestamp /path/to/BACKUP-DIR/full-backup

innobackupex: completed OK!
```

- "xtrabackup-checkpoints" file contents:

    - backup_type = full-backuped

    - from_lsn = 0

    - to_lsn = 3768762

Incremental Database Backup

- ## Create the first incremental backup:

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--no-timestamp --incremental /path/to/BACKUP-DIR/INC1
--incremental-basedir=/path/to/BACKUP-DIR/full-backup

innobackupex: completed OK!
```

- "xtrabackup-checkpoints" file contents:

  - backup_type = incremental

  - from_lsn = 3768762

  - to_lsn = 4908762

Incremental Database Backup

- ## Create the second incremental backup:

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--no-timestamp --incremental /path/to/BACKUP-DIR/INC2
--incremental-basedir=/path/to/BACKUP-DIR/INC1

innobackupex: completed OK!
```

- "xtrabackup-checkpoints" file contents:

    - backup_type = incremental

    - from_lsn = 4908762

    - to_lsn = 6508762

Incremental Database Backup

- ## **Prepare the backup files:**

1- Replay the committed transactions in the base backup

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--apply-log --redo-only /path/to/BACKUP-DIR/full-backup

innobackupex: completed OK!
```

2- Replay the committed transactions in the 1st incremental backup

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--apply-log --redo-only /path/to/BACKUP-DIR/full-backup
--incremental-dir=/path/to/BACKUP-DIR/INC1

innobackupex: completed OK!
```

- ## **Prepare the backup files:**

3- Replay the committed transactions in the 2nd incremental backup

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--apply-log --redo-only /path/to/BACKUP-DIR/full-backup
--incremental-dir=/path/to/BACKUP-DIR/INC2

innobackupex: completed OK!
```

4- Roll back all uncommited transactions

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--apply-log /path/to/BACKUP-DIR/full-backup

innobackupex: completed OK!
```

Incremental Database Backup

- **Restore the full backup (incremental + base):**

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--copy-back /path/to/BACKUP-DIR/full-backup

innobackupex: completed OK!
```

OR

```
 $shell> mv /path/to/BACKUP-DIR/full-backup /var/lib/mysql
```

Then, assign the right permissions to mysql user:

```
 $shell> chown -R mysql:mysql /var/lib/mysql
```

Incremental Database Backup

- ## Advantages:

  - Less storage resources needed.

  - Faster than the full backup.

  - Less processing time required.

- ## Disadvantages:

  - Complicate and hard process to implement as compared to the full backup.

  - Based on Log Sequence Number (LSN), MyISAM doesn't affected.

  - Appending all incrementals might consume time.

Incremental Database Backup

- **Important hints:**

    - The backup sequence steps above, must be followed with the **same** order.

    - Replaying the committed transaction steps, **append** all incremental data to the full backup directory.

    - Not using "–redo-only" option.

Partial Database Backup

Partial Database Backup

- ## Create the backup files:

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--no-timestamp --databases="db1 db2 db3.tbl1"
/path/to/BACKUP-DIR/partial-backup

innobackupex: completed OK!
```

- ## Prepare the backup files

```
$shell>innobackupex --user=DBUSER --password=DBUSERPASS
--apply-log --export /path/to/BACKUP-DIR/partial-backup

innobackupex: completed OK!
```

Partial Database Backup

- ## **Restore the partial backup:**

1- Creating the tables:

```
mysql> CREATE TABLE db.tbl1 (...)ENGINE=INNODB;
```

2- Discard it's tablespace

```
mysql> ALTER TABLE db.tbl1 DISCARD TABLESPACE;
```

Partial Database Backup

- ● **Restore the partial backup:**

3- Copy "tbl1.ibd" and "tbl1.exp" files into the DB directory and assign the right permissions to mysql user.

```
$shell> cp -R /path/to/BACKUP-DIR/partial-backup/db/tbl1.*
/var/lib/mysql/db
$shell> chown -R mysql:mysql /var/lib/mysql/
```

4- Use the new tablespace

```
mysql> ALTER TABLE db.tbl1 IMPORT TABLESPACE;
```

Partial Database Backup

- ## Advantages:

  - Although it's a complicated process, but it allows us to backup and restore individual InnoDB tables like MyISAM.

- ## Disadvantages:

  - Streaming feature not supportted.

  - Destination server should use **Percona Server**.

  - Too much effort in the restore.

Partial Database Backup

- ## Important hints:

  - **Empty** datadir can be used.

  - "innodb_file_per_table" server option **must be enabled** (in both source and destination servers) .

  - "innodb_expand_import" server option must be enabled in the destination server (available only in *Percona server*) .

  - Alternative options:

    - --include='db.tbl1'

    - --tables-file=/path/to/file.txt ==> in which you can add multiple tables one per line in the fully qualified format.

Partial Database Backup

- ## Download:

  http://www.percona.com/downloads/XtraBackup/

- ## Installation Manual:

  http://www.percona.com/doc/percona-xtrabackup/2.1/installation.html

Q & A

Questions ?

Discussion?

We have time for some face-to-face talks...

- **FromDual provides neutral and independent:**
  - **Consulting**
  - **Remote-DBA**
  - **Support for MySQL, Galera, Percona Server and MariaDB**
  - **Training**

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