Mariabackup – too rarely used

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Why do we need backups?

- Hardware Crash
  - Does NOT happen that often!
    → HA solution with Failover, is fast (< 10 s)
    → Restore, is not so fast (many minutes to hours!)
- Setup of Slaves or Testing Systems
  - Typically no hard time constraints
- Logical Errors!!!
  - Most frequent issue
    → They are spread very fast, no need to tune!
Terminology

- Since MariaDB 10.4 / 10.5:
  - `mysqldump` → `mariadb-dump`
  - `mysql` → `mariadb`
  - `mariabackup` → `mariadb-backup`
  - `mysqlbinlog` → `mariadb-binlog`
  - etc.
Types of Backups

• Logical
  • **Dump:** mariadb-dump

    ```
    foreach ( schema )
    foreach ( table )
    SELECT * FROM table INTO outfile;
    ```

• Physical
  • **Mariabackup:** mariadb-backup
  • **Snapshots (LVM, FS, VM)**

    ```
    cp -r $datadir/* /mnt/tape
    ```
Restore/Recovery Metrics

- **Restore/Recovery Goal:**
  - Manager: Immediately and NO loss of data at NO costs!

- **Realistic Recovery Goals:**
  - Does Restore/Recovery work at all?
  - Recovery Point Objective (RPO)
    - How much data can we accept to loose?
  - Recovery Time Objective (RTO)
    - How long does a Restore/Recovery take?

Source: https://en.wikipedia.org/wiki/Disaster_recovery
Granularity of Backups

- Full Instance ($datadir/*)
  - Full Backup
- One or several schemas (test, world, ...)
  - Partial Backup, Schema Backup
- One or several tables (City, Country, ...)
  - Less than a schema or tables from different schemata
  - Partial Backup, Table Backup

- What do we need to Restore?
  - Full instance? One Schema only? One Table only?
  - And is this possible at all? And if yes how?
  - When we do the Backup we typically do not know what to Restore!
    - → Full Backup
Steps to do a Mariabackup

• Backup
  • Copies the files to backup location
• Prepare (old: apply-log)
  • Make backup consistent
  • Can be done at Backup or at Restore time!

• Full Restore
  • Shutdown Instance
  • `rm -rf $datadir/*`
  • Prepare (if not done during Backup yet)
  • Restore
    • Copies the files from backup location to $datadir
    • `chown mysql: $datadir/*` → Feature Request!
    • `restorecon -R $datadir` (SElinux)
Mariabackup steps

mariadb-backup --user=root --backup \  
    --target-dir=/mnt/tape/backup

mariadb-backup --prepare \  
    --target-dir=/mnt/tape/backup

----

rm -rf $datadir/*

mariadb-backup --copy-back \  
    --datadir=/var/lib/mysql --target-dir=/mnt/tape/backup

chown -R mysql: /var/lib/mysql

Feature Requests for Mariabackup Developers:
* --backup-and-prepare
* Preserve ownership of files during --copy-back/--move-back
Performance differences

• Our little DWH: < 30 Gibyte

• Logical Backup: mariadb-dump:
  • Backup: 229 s
  • Size (uncompressed): 17'056 Mibyte
  • Restore: 2671 s

• Physical Backup: mariadb-backup:
  • Backup: 180 s
  • Size (uncompressed): 28'884 Mibyte
  • Prepare: 94 s
  • Restore: 172 s
Point-in-Time-Recovery

- What for?
  - Reduce data loss (improve RPO)
  - Theoretically up to the last transaction!
- How?
  - Binary Logging (`log_bin = binlog`)
  - Full backup
  - Starting point (`xtrabackup_binlog_info`)

```
mariadb-binlog --disable-log-bin \n--start-position=47196247 \n--stop-datetime='2021-02-08 13:59:00' binlog.000023 \nbinlog.000024 binlog.000025 ... | mariadb --user=root
```
Where has the time gone?

- Backup (< 30 Gibyte): 180 s
  - Mostly NOT relevant, we have 24 hours time!
- Prepare: 94 s
  - Can take some time depending on the traffic.
- Restore: 172 s
  - More or less the same time like Backup
- Pre- and Post-Restore tasks: 60 - 300 s?
  - Shutdown, chmod, restorecon, Startup
- PiTR Begin and End point (RPO) evaluation: 15 min?
  - Begin is easy, End is tricky (time or transaction or end)...
- Communication and Synchronization overhead (30 – 120 min ???)
  - Stop application, start application. What to recover, until when?
- PITR itself...
  - Depends on traffic/volume (worst case more than 24 h!?!)
- RTO? 2 h (7200 s)? 4 h (14400 s)?
What is left?

- Partial Backup/Restore
  - Partial Table or Schema restore from MariaBackup full backup
  - A bit more complicated!
- Incremental Backup/Restore
  - Even more complicated!
  - Consumes more time during restore (at least 2 passes)
- Schema or Table PiTR
Questions?
Discussion?
We have time for some personal talks...

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