# Mariabackup – too rarely used

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# Why do we need backups?

- **Hardware Crash**
  - **Does NOT happen that ofen!**
    - **→ 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`**

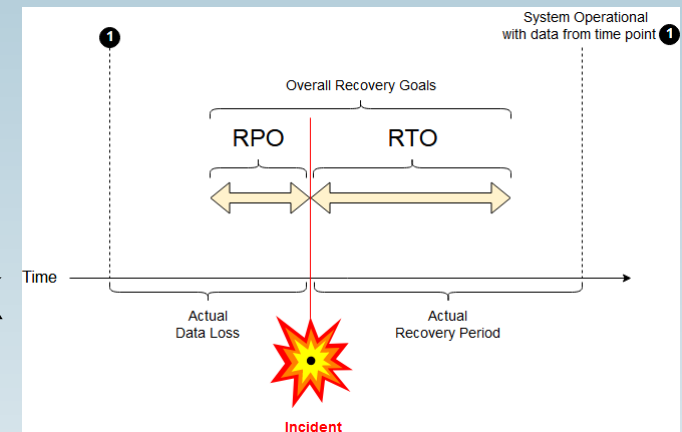  - **Snapshots (LVM, FS, VM)**

    ```
    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

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- **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 \
--start-position=47196247 \
--stop-datetime='2021-02-08 13:59:00' binlog.000023 \
binlog.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**
  - **https://fromdual.com/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)**
  - **https://fromdual.com/mysql-enterprise-backup-incremental-cumulative-and-aifferential-backup**
- **Schema or Table PiTR**
  - **https://fromdual.com/mysql-table-point-in-time-recovery-from-mysqldump-backup**

# Q & A

Questions ?

Discussion?

We have time for some personal talks...

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