# Backup and Restore Tool Performance Analysis

## Setup

* Created a console application that generates **N** number of databases.
* For this test, a database named **test\_db\_1** was created, which contained **100 tables**, named order\_1 to order\_100.
* Each table contained **128,975 records**.
* Size of each table’s **.ibd file** was approximately **88 MB**.
* Total size of all **.ibd files** in the **test\_db\_1** folder was approximately **8.59 GB** on disk.

## Test with MySQL Workbench

1. **Export Process**
   * Export started at **12:46:30**.
   * Export completed at **12:52:25**.
   * **Total export time:** **6 minutes and 5 seconds**.
   * **Dump file size:** **7.31 GB**.
2. **Import Process**
   * Import started at **14:49:09**.
   * Import completed at **15:08:08**.
   * **Total import time:** **18 minutes and 59 seconds**.

## Test with HeidiSQL

1. **Export Process**
   * **Total export time:** **24 minutes**.
   * **Export file size:** **12.5 GB**.
2. **Import Process**
   * Import process in HeidiSQL was **not feasible**. The file had to be loaded into the query editor and then executed.
   * After **1.5 hours**, the file still didn’t load properly, indicating a significant issue with HeidiSQL’s import handling for large files.

## Test with mysqldump (CLI)

1. **Export Process**
   * Export started at **10:18**.
   * Export completed at **10:23**.
   * **Total export time:** **5 minutes**.
   * **Dump file size:** **7.31 GB**.
2. **Import Process**
   * Import started at **10:25**.
   * Import completed at **10:42**.
   * **Total import time:** **17 minutes**.

# Backup and Restore Tool Performance Comparison

| **Tool** | **MySQL Workbench** | **HeidiSQL** | **mysqldump (CLI)** |
| --- | --- | --- | --- |
| **Export Time** | 6 minutes 5 seconds | 24 minutes | **5 minutes** |
| **Export File Size** | 7.31 GB | 12.5 GB | 7.31 GB |
| **Import Time** | 18 minutes 59 seconds | Not feasible (file did not load) | **17 minutes** |
| **Total Time** | **25 minutes 4 seconds** | N/A | **22 minutes** |
| **Performance** | Efficient, fast export/import | Slow export, unfeasible import | **Fastest export, efficient import** |

## Conclusion

* **mysqldump (CLI)** outperformed both **MySQL Workbench** and **HeidiSQL**, achieving the **fastest export time** (5 minutes) and an **efficient import time** (17 minutes).
* **MySQL Workbench** performed well, completing the entire process in **25 minutes 4 seconds**, with a balanced export/import speed.
* **HeidiSQL** was **not feasible** for large imports, as the exported file was significantly larger (12.5 GB), and the import process failed even after **1.5 hours**.
* **mysqldump (CLI) is the most efficient tool** for large database backups, with both export and import being the fastest among the tested tools.