

S3- Db02

Sander van Deurzen

**Research: H2 database comparison**

14-06-2022

**Should I use an H2 database for testing instead of conventional databases?**

# Introduction

## what is an H2 database?

## H2 is an open-source lightweight Java database. It can be embedded in Java applications or run in the client-server mode. Mainly, H2 databases can be configured to run as an in-memory database, which means that data will not persist on the disk. Because it is an embedded database, it is not used for production development, but mostly used for development and testing.

The main features of H2 Databases are as follows −

* It is an extremely fast database engine.
* H2 is open source and written in Java.
* It supports standard SQL and JDBC API. It can use PostgreSQL ODBC driver too.
* It can run embedded and in Server mode.
* H2 supports **clustering** and **multi-version concurrency**.
* It has strong security features.

## Pros and cons

**Pros**:

* Can run as an in-memory database.
* Is light weight (only 2MB).
* Simple setup, it only needs a dependency added to your application plus a few config lines.
* It is SQL compliant, so it is compatible with most relational databases.

**Cons**:

* If raw SQL queries are used, there may be differences between [MySQL](https://www.trustradius.com/products/mysql/reviews) and H2. An ORM library should be used.
* Support seems to be community-based only. Not very much information to find online compared to more popular databases (like MYSQL or PostgreSQL).

# How can I execute tests with an H2 database?

Before the tests can run, we have to set up the configuration of the database. We can install the H2 database package that java Spring Boot provides. After that, the configuration has to be set in the properties file.

Application properties:

Afbeelding met tekst

Automatisch gegenereerde beschrijving

Tests with H2 database

Afbeelding met tekst

Automatisch gegenereerde beschrijving

As you can see above, a temporary database has been made and the test got completed in only 3.447 seconds trough the help of my H2 database

# How much faster are H2 databases compared to other databases?

Both MYSQL & H2 Database Engines are relational databases and use the same query language. Application features can be implemented with both, but if it's expected that the application will be used by a large user base or is complex, MYSQL is better. Cloud providers provide scaling support for [MYSQL](https://www.trustradius.com/products/mysql/reviews) and are more battle-tested. H2 is good when it's a small application as H2 is easier & quicker to set up~~.~~ That’s why I use an H2 database for my tests.

## Performance Comparison

In many cases, H2 is faster than other (open source and not open source) database engines. Please note that these are mostly single connection benchmarks running on one computer, with many very simple operations running the database. This benchmark does not include very complex queries. The embedded mode of H2 is faster than the client-server mode because the per-statement overhead is greatly reduced.

This is a table that represents the time it takes to tests different types of cases with different databases. You can see that in almost all cases, the H2 databases functions more quickly than the others.

Afbeelding met tafel

Automatisch gegenereerde beschrijving

Conclusion:

An H2 database is the best database to work with if you are trying to use integration tests with temporary databases in your application. It is easy to set up and easy to use in projects.

Sources:

For the comparison of other databases

<http://www.h2database.com/html/performance.html>

For the reviews and pros and cons of the H2 database

<https://www.trustradius.com/>