

# Hazelcast

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TODO: General Introduction

## 1 Key-Value-Stores

TODO:

### 1.1 History of Key-Value-Stores

TODO: Change

### 1.2 Working principle of Key-Value-Stores

TODO:

### 1.3 Comparison of Key-Value-Stores to relational Databases

TODO:

## 2 Hazelcast in Theory

TODO:

## 2.1 Hazelcast in CAP-Theorem

TODO:

## 2.2 BASE in Hazelcast

TODO:

# 3 Hazelcast in Practice

The goal of this section is to test Hazelcast in practice. With this goal in mind, we will first install Hazelcast, and then we will try to implement some example data structures. We will take a look at the Usability of the Hazelcast interface.

In this section following limitations are taken into account: First only the Open-Source Hazelcast Platform is used. Second, only the Hazelcast Command Line Interface (CLI) is used. Therefore the Hazelcast cloud service Viridian is not used and will not be evaluated. Furthermore, the Hazelcast Clients outside of the Hazelcast CLI are not used, and will not be evaluated. The datastructure used for testing is taken from a previous lecture. **TODO:**

## 3.1 Installation of Hazelcast

There are multiple ways to install Hazelcast. Due to the fact that Hazelcast is open-source and provides Binaries. Therefore, it's possible to build the Hazelcast Plattform from source. However, it is easier to download the prebuild binaries. For Linux there is a debian package available. For MacOS there is a brew package available, but for Windows there is no package or installer available. Therefore, under Windows you have to download the prebuild binaries, if you don't want to build Hazelcast from source. Another option is to use docker. (Hazelcast, [2023a](#))

We tried the Hazelcast installation on multiple operating systems, but weren't able to test the installation on MacOS. Therefore, we will only describe the installation on Linux and Windows, and will take a look at the installation via docker. The installation on Linux is very easy and straight forward: First you will download the public key of the Hazelcast repository and add the repository to your package manager sources:

```
wget -qO - https://repository.hazelcast.com/api/gpg/key/public | gpg
  --dearmor | sudo tee /usr/share/keyrings/hazelcast-archive-keyring
.gpg > /dev/null
echo "deb [signed-by=/usr/share/keyrings/hazelcast-archive-keyring.
gpg] https://repository.hazelcast.com/debian stable main" | sudo
tee -a /etc/apt/sources.list
```

Listing 1: Adding the Hazelcast repository to the package manager sources under Linux (Debian) (Hazelcast, [2023a](#))

After that you will be able to install Hazelcast via the package manager like any other package:

```
sudo apt update && sudo apt install hazelcast
```

Listing 2: Installing Hazelcast under Linux (Debian) (Hazelcast, [2023a](#))

The installation under Windows was a bit more complicated. First of all Hazelcast did not provide a Windows installer. Therefore, we had to download the binary from the Hazelcast website. This binary wasn't able to run directly, because it needed the `JAVA_HOME` environment variable to be set. First we tried to install a Java Runtime Environment (JRE) and set the `JAVA_HOME` variable accordingly. However the JRE was not able to run the Hazelcast binary and a Java Development Kit (JDK) was needed. Therefore, we installed the JDK set the path, and then the Hazelcast binary was able to run. However, personally we found the installation with docker the easiest. First of all, the Hazelcast image is downloaded from the docker hub:

```
docker pull hazelcast/hazelcast
```

Listing 3: Downloading the Hazelcast image from the docker hub (Hazelcast, [2023a](#))

After that the local Hazelcast Cluster is started as specified in the documentation:

```
docker network create hazelcast-network
docker run \
  -it \
```

```
—network hazelcast—network \  
—rm \  
—e HZ_CLUSTERNAME=hello—world \  
—p 5701:5701 hazelcast/hazelcast
```

Listing 4: Starting the Hazelcast Cluster using the docker image (Hazelcast, [2023b](#))

For the following example the docker installation will be used.

## 3.2 Example in Hazelcast

TODO:

## 3.3 Usage and API of Hazelcast

TODO: Überlegen ob ich noch mehr schreiben will

# 4 Evaluation of Hazelcast

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## 4.1 Advantages of Hazelcast

TODO:

## 4.2 Disadvantages of Hazelcast

TODO:

### 4.3 Lessons learned

TODO:

## 5 Conclusion and Recommendations

TODO:

## References

- Hazelcast. (2023a). *Installing hazelcast open source*. Retrieved March 7, 2023, from <https://docs.hazelcast.com/hazelcast/latest/getting-started/install-hazelcast>
- Hazelcast. (2023b). *Start a local cluster in docker*. Retrieved April 8, 2023, from <https://docs.hazelcast.com/hazelcast/latest/getting-started/get-started-docker>