Cluster-Computing and Parallelisation for the Multi-Dimensional PH-Index

Master Thesis

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Abstract

Here comes the abstract.

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1 Introduction

1.1 Multi-dimensional Indexes

1.1.1 Background information

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This is an example of how to cite a scientific publication [1] from your bibliography (BibTeX[1] file). And this example shows how you create links within your documents, e.g. link to section 1.1.

[1] http://en.wikipedia.org/wiki/BibTeX

2 Design and Implementation

2.1 Algorithms

2.1.1 Data partitioning

Describe here how the key-value pairs are partitioned across the hosts.

2.1.2 Data balancing

Describe how the key-value pairs are balanced across the index nodes.

2.1.3 Basic Index operation

Describe the point operations here. These are operations that affect a single key-value pair, like get, put, delete, contains, etc.

2.1.4 Iterators

Describe how iterators are handle when dealing with a cluster of index servers. Describe the current algorithm used and the alternatives.

2.1.5 Range search

Describe how the range search is performed. Describe how the number of hows that need to be querried is reduced and what the alternatives are.

2.2 Implementation

Describe the technologies used, the reasons for which these technologies were chosen and any alternatives.

Currently used frameworks:

ZooKeeper ZooKeeper is used for stored cluster metadata and membership. Currently, the only alternative would have been to implement such a distributed storage manager manually. Using ZooKeeper saved a lot of development time.

Netty Netty is a Java IO library and it is used to implement the server request handling component. Alternatives would have been Java NIO library.

Kryo Kryo is very fast serialization library for Java and it is used to serialize the values that have to be stored on the server. These objects need to be transformed into a represention that can be sent over the network. Kryo is faster than the Java serialization, does not require the implementation of the Serializable interface and transforms the objects into byte arrays. This should make the representation smaller than simply transforming the object to a string.

3
Performance Analysis

3.1 Benchmark

4
Conclussions

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Acknowledgements

Bibliography

[1] Alfonso Murolo. Designing wordpress themes by example. Master's thesis, ETH Zurich, 2013.