Bachelor Thesis

RDMA Key Value store:
Scalability of RDMA transportation types

Author: Jan Erik (Jens) Troost   (2656054)

1st supervisor: Animesh Trivedi
daily supervisor: supervisor name
2nd reader: supervisor name

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Abstract

Here goes the abstract of this thesis.

Contents

CONTENTS

List of Figures

LIST OF FIGURES

List of Tables

LIST OF TABLES

1

Introduction

1.1   Context

Seemingly ever growing tech giants, such as Facebook, Amazon and Google, require fast, reliable and scalable key-value storage (KV-store) to serve product recommendations, user preferences, and advertisements. A KV-store is a data storage type which aims to store many small values and provides a high throughput and low latency interface. KV-stores usually offer a simple interface using 3 commands: GET, SET, and DEL. A trivial implementation involves a hash-table which matches the hash value of a given key, to the value associated with that key. Past implementations of KV-stores have focussed on improving these underlying data structures. For example, Cuckoo and Hopscotch1 (1) hashing, have presented an alternative of an improved hash table algorithm. Nonetheless, with recent developments with RDMA networks, it has become a more attractive method to improve KV-stores.

Remote direct memory access (RDMA) networks have increasingly become more popular in commercial and academic data centers, due to the increase in availability and decrease in cost for RDMA capable network interface cards (RNICs). RDMA offers a more direct connection between two machines, by interfacing the memory directly. Instead of the operating system (OS) handling the incoming and outgoing packets, RNICs implement this in hardware, requiring no additional help from the OS and CPU. This results in lowering the overall latency and CPU overhead. However, making efficient use of such networks requires in-depth knowledge on the hardware constraints which are present in the RNICs and processors(2).

1.2 Objective

1.3 Research Question

Which RDMA transportation type is best for RDMA KV-store?

How scalable are these transportation types, compared to traditional TCP?

1.4 Research Method

A simple KV-store will be implemented. The backend, networking side, will be flexibly implemented to accommodate for the various transportation types.

Benchmarks will be done on DAS 5 computing cluster.

1.5 Thesis Contributions

RDMAmojo? DAS?

1.6 Plagiarism Declaration

1.7 Thesis Structure

2

Background

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3

Design

...

3. DESIGN

4

Implementation

...

5

Evaluation

...

5. EVALUATION

6

Related Work

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6. RELATED WORK

12

References

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[2] YOUMIN CHEN, YOUYOU LU, AND JIWU SHU. **Scalable rdma rpc on reliable connection with efficient resource sharing**. In *Proceedings of the Fourteenth EuroSys Conference 2019*, pages 1–14, 2019. 1