An Investigation into improving multi-GPU applications with Data compression

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Abstract

This project aims to research the viability of compressing data on a Graphics Processing Unit(GPU) before sending it to another GPU to reduce the transfer time and bandwidth utilisation. The resulting data will be used to analyse the suitability of implementing compression methods into existing GPU workloads, such as real-time rendering, or distributed general purpose computation.

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1 Introduction

1.1 Aims and Objectives

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1.2 Research Questions

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1.3 Scope

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1.4 Report Structure

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2 Background

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2.1 Parralel alogrithms

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2.2 Graphics Processing Units

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2.3 GPGPU APIs

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2.3.1 OpenCl

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2.3.2 Cuda

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2.4 Data Transfer bottlenecks

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2.5 Data Compression

This is a sub sub section with a list of bullet points.

- A working X, that will be used for this investigation.
- Investigation of current tools and their potential use during an investigation of X .
- Programming of X with related frameworks Y and Z.
- That is all.

3 Literature Review

3.0.1 Data tWrasfer between nodes in a muti-node system

Distributed systems are commonplace in solving large computation tasks.
Not just HPC - general networking, and single pc system
Time is money
Waiting on transfers is a waste of money and energy
Trade-off between adding more nodes verses fewer faster nodes, often super fast anyway

3.0.2 Data Compression

Basic method of not sending data that doesn't need sending
Lossless is always needed expect in some circumstances
Hardware level compression is a thing
Sequential vs parallel

3.0.3 Gpu Compression

Double vs Single precision
No Branching
Gpus can already compress iamges quickly

3.0.4 Gpu Data Transfer

busy Cpu can cause slowdowns
Busy PCI device can cause slowdowns
Constant bandwidth, even with more devices
Hardware DMa
custom firmaware

Appendices

A Project Overview

A.A Example sub appendices

...

B Second Formal Review Output

Insert a copy of the project review form you were given at the end of the review by the second marker

C Diary Sheets (or other project management evidence)

Insert diary sheets here together with any project management plan you have

D Appendix 4 and following

insert content here and for each of the other appendices, the title may be just on a page by itself, the pages of the appendices are not numbered, unless an included document such as a user manual or design document is itself pager numbered.