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# Medusa A Parallel Graph Processing System On Graphics

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## [Book] Medusa A Parallel Graph Processing System On Graphics

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### Medusa A Parallel Graph Processing

#### **Medusa: A Parallel Graph Processing System on Graphics ...**

Medusa is a parallel graph processing system on graphics processors (GPUs) The core design of Medusa is to enable developers to leverage the massive parallelism and other hardware features of GPUs by writing sequential C/C++ code for a small set of APIs This simplifies the implementation of parallel graph processing on the GPU

#### **Medusa A Parallel Graph Processing System On Graphics**

Medusa is a parallel graph processing system on graphics processors (GPUs) The core design of Medusa is to enable developers to leverage the massive parallelism and other hardware features of GPUs by writing sequential C/C++ code for a small set of APIs Medusa: A Parallel Graph Processing System on Graphics Medusa is a parallel graph

#### **Parallel Graph Processing on Graphics Processors Made Easy**

and the superior performance of Medusa with a series of common graph processing operations 2 RELATED WORK Parallel graph processing Parallel algorithms have been a classical way to improve the performance of graph processing On multi-core CPUs, parallel libraries like MTGL [3] have been developed for parallel graph algorithms

#### **Medusa: Simplified Graph Processing on GPUs**

21 Graph Processing Parallel algorithms have been a classical way to improve the performance of graph processing On multicore CPUs, parallel libraries such as MTGL [7] have been developed for parallel graph algorithms Similar to Medusa, MTGL offers a set of data structures and APIs for building graph algorithms The MTGL API is modeled after

## Medusa - University of Cambridge

Graph processing algorithms are often inherently parallel GPUs consist of many processors running in parallel But... writing this code is hard The Solution Medusa is a C++ framework for graph processing on (multiple) GPUs High programmability (expressive) Related Work MTGL Parallel graph library for multicore CPUs Pregel

### PARALLEL GRAPH PROCESSING ON GRAPHICS PROCESSING ...

processing due to the irregularities of graph structures Even worse, there lacks an efficient method and runtime system on the GPU to support concurrent graph processing tasks from multiple applications and/or users To address those challenges, we develop the Medusa system to simplify parallel graph processing on the GPU and to support high

### Gunrock: A High-Performance Graph Processing Library on ...

rectly for different graph algorithms In Medusa [30], Zhong and He presented their pioneering work on GPU-based programming model for parallel graph processing using message passing model CuSha [16] implements the parallel-sliding-window (PSW) graph representation on the GPU to avoid non-coalesced memory access Both frameworks offer a small

### Optimizing Graph Processing on GPUs

Medusa provides a more fine-grained programming interface than Pregel, exposing fine-grained data parallelism on edges, vertices and messages, which is called EMV model This model enhances the vertex-centric model to provide support for efficient graph processing on GPUs Using the APIs offered by Medusa, programmers can define

### (THE LANDSCAPE OF) PARALLEL GRAPH PROCESSING: A VIEW ...

(THE LANDSCAPE OF) PARALLEL GRAPH PROCESSING: A VIEW FROM HOLLAND What to do when your graphs get out of control ? Ana Lucia Varbanescu, University of Amsterdam, The Netherlands

### Gunrock: A High-Performance Graph Processing Library on ...

to generate the active elements set directly for different graph algorithms In Medusa [32], Zhong and He presented their pioneering work on GPU-based programming model for parallel graph processing using message passing model CuSha [17] implements the parallel-sliding-window (PSW) graph representation on the GPU to avoid non-coalesced

### Frog: Asynchronous Graph Processing on GPU with Hybrid ...

Many parallel graph algorithms adopt the asynchronous computing model to accelerate the iterative convergence non-preprocessed (such as Totem, Medusa, MapGraph, and Gunrock) and preprocessed (Cusha) approaches, by testing four graph processing can be commonly found in many computational domains, such as social networks and web link

### Scalable SIMD-Efficient Graph Processing on GPUs

Scalable SIMD-Efficient Graph Processing on GPUs Farzad Khorasani Rajiv Gupta Laxmi N Bhuyan Computer Science and Engineering Department University of California Riverside, CA, USA {fkh001, gupta, bhuyan}@csucredu Abstract—The vast computing power of GPUs makes them an attractive platform for accelerating large scale data parallel

### SEP-Graph: Finding Shortest Execution Paths for Graph ...

SEP-Graph: Finding Shortest Execution Paths for Graph Processing under a Hybrid Framework on GPU Hao Wang†, Liang Geng†§, Rubao Lee‡, Kaixi Hou¶, Yanfeng Zhang§, Xiaodong Zhang†\* †Department of Computer Science and Engineering, The Ohio State University, Columbus, OH, USA,

## A Distributed Multi-GPU System for Fast Graph Processing

We present Lux, a distributed multi-GPU system that achieves fast graph processing by exploiting the aggregate memory bandwidth across a multi-GPU cluster. In Lux, the entire graph representation is distributed onto the DRAM and GPU memories of one or multiple nodes. The distributed graph placement is designed to minimize data trans-

### final USC-2016

Parallel Graph Processing 2 - Limited Memory Storage System - Limited Device Memory & Bandwidth - Communication High Latency (GraphChi, XStream etc) GPUs + Massive Parallelism Power Efficiency Clusters + Scalability Memory & Cores Multicores + Efficient Parallelism GPUs (VWC, Medusa, Totem etc) Clusters (GraphLab, GraphX etc) Multicores

### rtifa ct Gunrock: A High-Performance Graph on s is ...

In Medusa [37], Zhong and He presented their pioneering work on a high-level GPU-based system for parallel graph processing, using a message-passing model. CuSha [18], targeting a GAS abstraction, implements the parallel-sliding-window (PSW) graph representation on the GPU to avoid non-coalesced memory access. CuSha

### Performance Characterization of Multi-threaded Graph ...

Performance Characterization of Multi-threaded Graph Processing Applications on Many-Integrated-Core Architecture. Lei Jiang, Langshi Chen, Judy Qiu. School of Informatics, Computing, and Engineering, Indiana University Bloomington. {jiang60, lc37, xqiu}@indiana.edu. Abstract—In the age of Big Data, parallel graph processing has

### Efficient and Simplified Parallel Graph Processing over CPU ...

Efficient and Simplified Parallel Graph Processing over CPU and MIC. Linchuan Chen, Xin Huo, Bin Ren, Surabhi Jain, Gagan Agrawal. Department of Computer Science and Engineering, The Ohio State University, Columbus, OH 43210. {chenlinc, huox, ren, jainsu, agrawal}@cseohio-state.edu. Abstract—Intel Xeon Phi (MIC architecture) is a relatively

### Review Paper on Optimised and Accelerated Parallel Graph ...

CUDA kernels. Medusa storage component allows developers to initialize the graph structure through the use of system APIs like Add Edge and Add Vertex. Then Medusa runtime component, which is responsible for executing the user-defined APIs in parallel on GPU. Medusa BFS method, the Medusa applies L threads to vertex, has L edges.

### Poster P5260 Towards Realizing Topology Mutation for ...

Towards Realizing Topology Mutation for Iterative Graph Processing on a GPU. Useful to realize pointer jumping employed in many parallel graph algorithms. Medusa: Simplified graph processing on GPUs, IEEE Trans Parallel and Distributed Systems, 25 (6):1543-1556,