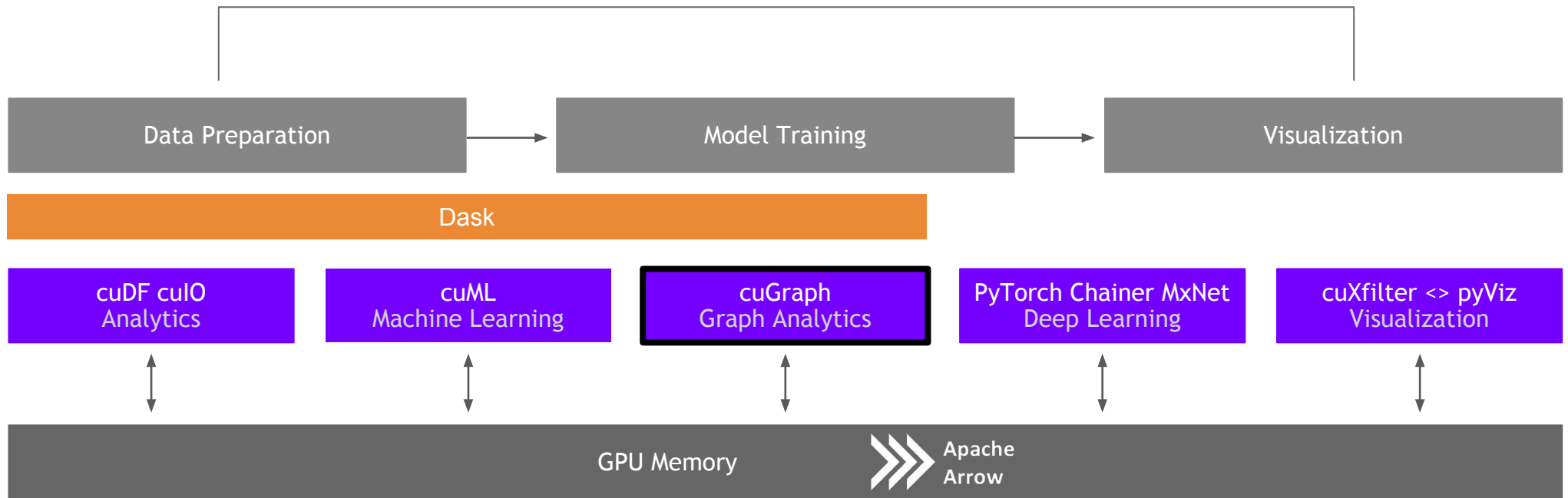


cuGraph

Graph Analytics

More connections more insights



GOALS AND BENEFITS OF CUGRAPH

Focus on Features and User Experience

Breakthrough Performance

- Up to 500 million edges on a single 32GB GPU
- Multi-GPU support for scaling into the billions of edges

Multiple APIs

- **Python:** Familiar NetworkX-like API
- **C/C++:** lower-level granular control for application developers

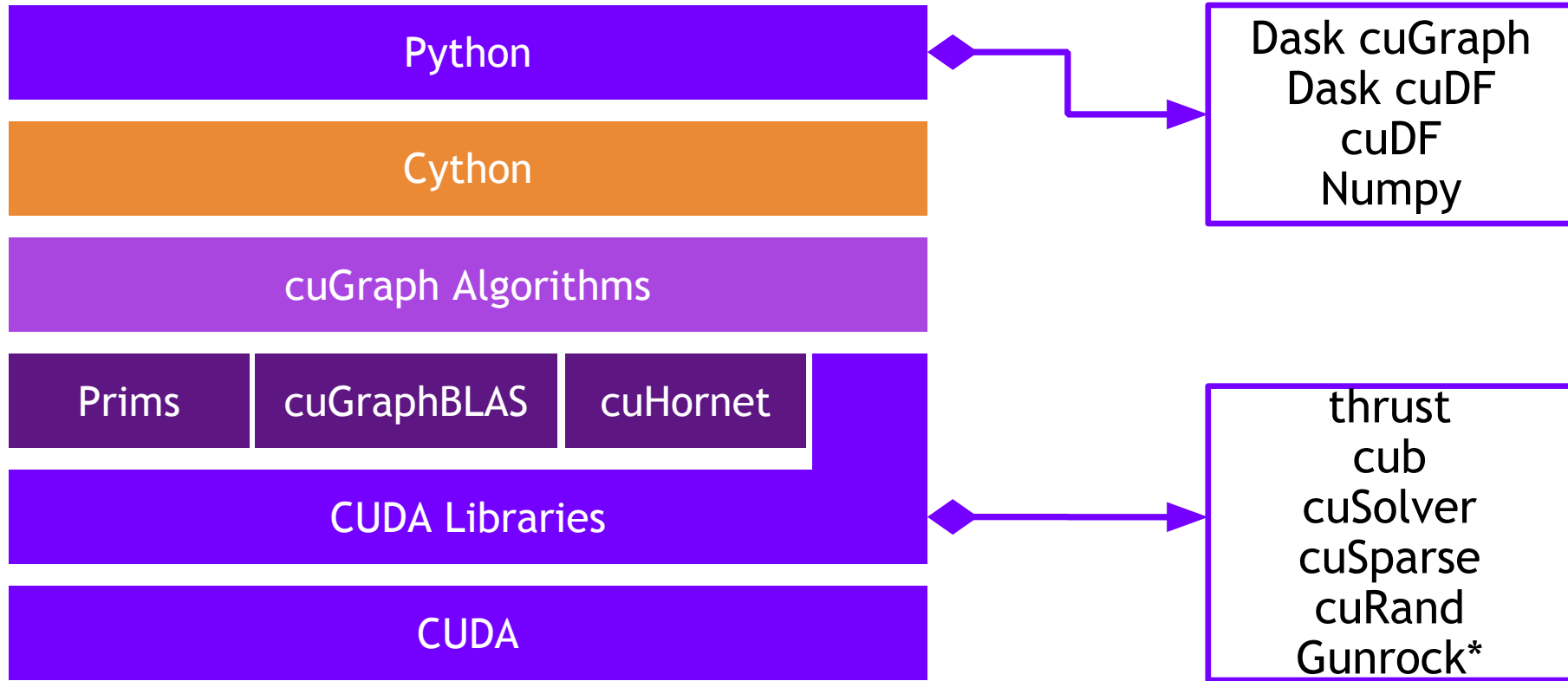
Seamless Integration with cuDF and cuML

- Property Graph support via DataFrames

Growing Functionality

- Extensive collection of algorithm, primitive, and utility functions

Graph Technology Stack

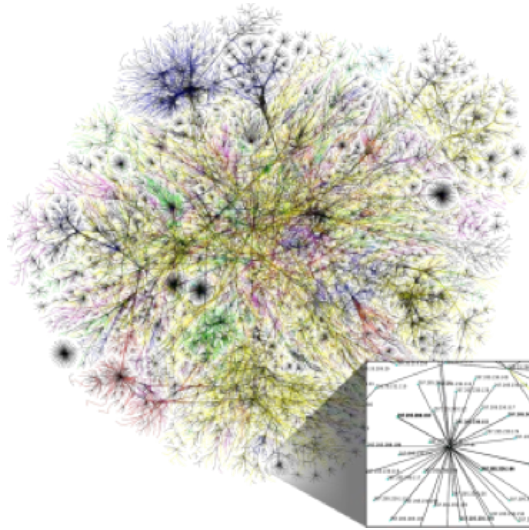


nvGRAPH has been Opened Sourced and integrated into cuGraph. A legacy version is available in a RAPIDS GitHub repo

* Gunrock is from UC Davis

Algorithms

GPU-accelerated NetworkX



Query Language

Multi-GPU

Utilities

More to come!

Community

Components

Link Analysis

Link Prediction

Traversal

Structure

Spectral Clustering
Balanced-Cut
Modularity Maximization
Louvain
Subgraph Extraction
Triangle Counting

Weakly Connected Components
Strongly Connected Components

Page Rank (**Multi-GPU**)
Personal Page Rank

Jaccard
Weighted Jaccard
Overlap Coefficient

Single Source Shortest Path (SSSP)
Breadth First Search (BFS)

COO-to-CSR (**Multi-GPU**)
Transpose
Renumbering

Multi-GPU PageRank Performance

PageRank portion of the HiBench benchmark suite

HiBench Scale	Vertices	Edges	CSV File (GB)	# of GPUs	PageRank for 3 Iterations (secs)
Huge	5,000,000	198,000,000	3	1	1.1
BigData	50,000,000	1,980,000,000	34	3	5.1
BigData x2	100,000,000	4,000,000,000	69	6	9.0
BigData x4	200,000,000	8,000,000,000	146	12	18.2
BigData x8	400,000,000	16,000,000,000	300	16	31.8

Road to 1.0

August 2019 - RAPIDS 0.9

cuGraph	Single-GPU	Multi-GPU	Multi-Node-Multi-GPU
Jaccard and Weighted Jaccard			
Page Rank			
Personal Page Rank			
SSSP			
BFS			
Triangle Counting			
Subgraph Extraction			
Katz Centrality			
Betweenness Centrality			
Connected Components (Weak and Strong)			
Louvain			
Spectral Clustering			
InfoMap			
K-Cores			

Road to 1.0

March 2020 - RAPIDS 0.14

cuGraph	Single-GPU	Multi-GPU	Multi-Node-Multi-GPU
Jaccard and Weighted Jaccard			
Page Rank			
Personal Page Rank			
SSSP			
BFS			
Triangle Counting			
Subgraph Extraction			
Katz Centrality			
Betweenness Centrality			
Connected Components (Weak and Strong)			
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