**INTRODUCTION**

Graph-based representations are ubiquitous in many applications such as social networks, biology networks, and cybersecurity. Meanwhile, concurrent graph traversal serves as a building block for graph algorithms such as shortest path, reachability, and centrality.

**MOTIVATION**

Frontier sharing ratio for top-down improves by 450x and bottom-up 75%.

**SYSTEM DESIGN**

- **Expansion**
- **Inspection**
- **Status Array**
- **FQ Generation**
- **Frontier Queue**

**GROUPBY**

- **Rule 1**: The outdegress of two source vertices are less than \( p \).
- **Rule 2**: Two source vertices connect to at least one common vertex whose outdegree is greater than \( q \).

**JOINT TRAVERSAL**

- **Joint Frontier Queue (JFQ)**
- **Joint Expansion**
- **Joint Status Array (JSA)**

**BITWISE OPTIMIZATION**

Pack statuses of multiple traversals in one variable.

**CONCLUSION**

Joint traversal improves performance by 40%, Bitwise optimization additional 11x, and GroupBy additional 2x.

iBFS is able to accelerate concurrent traversals by up to 30x and scale to more than 112 GPUs, achieving 52,267 billion TEPS.