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**Ethereum QueryBench: Building a Query Data Visualization Tool
for Complex Queries in Hybrid Storage Blockchain Systems**

A Project Proposal by

Mr. Vihan Gamage

Supervised by

Mr. Ragu Sivaraman

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ABSTRACT

Ethereum blockchain lacks in query visualization tools and building complex queries. So Ethereum is not efficient in providing real-time insights in data-intensive applications that are targeted to have seamless integrations with off-chain storage solutions. This project addresses these very limitations by designing a tool, Ethereum QueryBench. By using this, blockchain developers can construct and execute complex queries and visualize them across a hybrid storage environment integrating both on-chain data from Ethereum and off-chain data stored in MongoDB. The objective is to provide query data visualisation and build complex queries.

Author tries to address these issues by taking a hybrid approach. A visual query-building user interface with MongoDB's document-oriented storage for agile data handling. The methodology was oriented toward the implementation of a seamless query interface by the developers that can handle complex queries, such as joins and aggregation, and manage data across the two layers of storage. Moreover, benchmarking techniques were applied, such as metrics about query performance and assessment of developer feedback, to evaluate the efficiency and usability of the tool.

Initial results are promising, both regarding query execution times and developer interaction-the visualization tool reduces the complexity of queries and enhances the retrieval speed of MongoDB immensely for off-chain data. Early quantitative metrics reveal optimized query performance with latency reduction across multiple test cases that involve complex data retrieval operations.

Keywords: Ethereum Query Bench, Low-level APIs, Query Execution, Query Visualization Tool, On-chain Data, off-chain Data

Subject Descriptors

- Information systems → Blockchain
- Information systems → Query optimization
- Software and its engineering → Software development methods
- Human-centred computing → User interface design.