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Abstract

With the increased shift towards GeoSpatial Web Services on both the Web and mobile platforms especially in the user-centric services, there is a need to improve the query response time. The traditional routing algorithm requires server to process the query and send the results to a client but here we are focussing on query processing within the client itself. This paper attempts to evaluate the performance of an existing NoSQL database and SQL database with respect to routing algorithm and evaluate whether or not we can deploy the computations on the client system only.

While SQL databases face the challenges of scalability and agility and are unable to take the advantage of the abundant memory and processing power available these days, NoSQL databases are able to use some of these features to their advantage. The nonrelational databases are more suited for handling the dynamic rise in the data storage and the increased frequency of data accessibility.

For this comparative study, MongoDB is the NoSQL engine while the PostgreSQL is the chosen SQL engine. The dataset is a synthetic dataset of road network with several nodes and we find the distance between source and destination using various algorithms. As a part of paper The implementation we are planning on using pgRouting for the analysis which currently uses PostgreSQL at the backend and implements almost all the routing algorithms essential in practical scenarios. We have currently analyzed the performance of NoSQL databases for various spatial queries and have extended that work to routing.

Initial results suggest that MongoDB performs faster by an average factor of 15x which increases exponentially as the path length and network data size increases in both indexed and nonindexed operations. This implies that nonrelational databases are more suited to the multiuser query systems and has the potential to be implemented in servers with limited computational power.

Further studies are required to identify its appropriateness and incorporate a range of spatial algorithms within non-relational databases.

Academic Discipline and Sub-Disciplines : open source ; spatial databases ; mongoDB ; routing ; GIS ;

Keywords : performance analysis ; spatial databases ; mongodb ; pgrouting ; routing problem ; mobile devices

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