Benchmarking a Non-Relational Database on a Wireless Environment

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Non-relational databases are specially designed mainly for cloud environments, which there are normally millions users accessing the data center [1]. Different from traditional relational databases, non-relational databases has only one big table containing all data. The operations are relatively simple and its responsiveness is much improved [3]. In this work, we first evaluated HBase (a popular non-relational database) by using a benchmarking program developed by Yahoo [2]. It is found that there is dramatic increase in delay while reading around 790 operations per second whereas there is no obvious increase in delay while updating data into the database server, as show in Fig.1. And then we developed a middleware, which connect mobile phones to an HBase centre.

Firstly, we set up a multi-node cluster and a single node data centre. Then we run different programes in order to get the performance compararison. The tests were run under both a single node HBase center and a multi-node (3 nodes) cluster. Three experiments were conducted. They were Column Family Evaluation, Column Evaluation and Read/Write Evaluation.
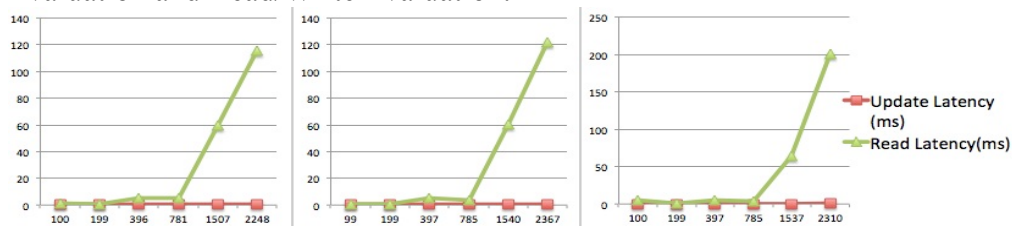

Fig.1 The test worked by creating a table with a single column family and then writing out a specific number of records to all columns within it. The horizontal axe is the number of records writing to table and the vertical axe represent latency

In order to get the performance of HBase under wireless environments, we developed a middleware to connect mobile phones to a HBase center. The role of the middleware is to facilitate access to a data center, and receive instructions from mobile users and then manipulate the non-relational databases (Fig.2). In conclusion we benchmarked how a middleware and a wireless condition affect database performance by comparaing the previous results.
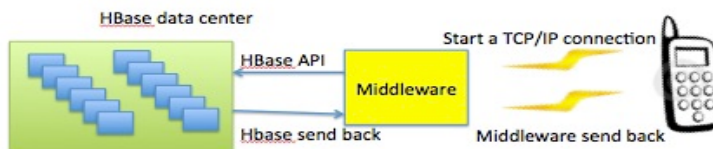

Fig.2 The structure of a working system. A middleware receives data from mobile users and manipulates the non-relational database.

References

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