

# Market Basket Analysis Algorithm with no-SQL DB HBase and Hadoop

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no-SQL DB has received highlights to maintain huge volumes of data based on the concept of Google's BigTable. HBase is one of no-SQL DBs, which run on Apache Hadoop Distributed File Systems (HDFS) and to handle big data. The paper presents a HBase schema to process transaction data for Market Basket Analysis algorithm. The algorithm runs on Hadoop Map/Reduce by reading data from both HBase and HDFS. Then, it sorts and converts the transaction data to data set with (key, value) pair, and stores the data to the HBase or HDFS. It is executed on Amazon EC2 platform instantiated by Whirr. The experimental results show that the code with Map/Reduce increases the performance as adding more nodes but at a certain point, there is a bottle-neck that does not allow the performance gain. Besides, executing the algorithm with data in HBase is slower than in HDFS.

**Keywords:** HBase, no-SQL, Map/Reduce, Market Basket Analysis, Data Mining, Hadoop, Whirr, Cloud Computing

## 1. INTRODUCTION

Data gets bigger and reaches peta- or tera-bytes as the web has grown in the world. Before Internet and Web did not exist, we did not have enough data to analyze people, society, and science etc with the limited volumes of data. However, since Internet and web came out, it has been more difficult to store and analyze data because of its huge volumes tera- or peta-bytes of data. *Google* faced to the issue as collecting big data and the existing file systems and Relational Database Management Systems (RDBMS) were not sufficient to store and handle the data efficiently. Besides, the legacy computing power and platforms were not useful for the big data. Thus, Google implemented Google File Systems (*GFS*), BigTable, and Map/Reduce parallel computing platform, which *Apache Hadoop* and *HBase* projects are motivated from.

*Hadoop* is the parallel programming platform built on Hadoop Distributed File Systems (*HDFS*) for Map/Reduce computation that processes data as (key, value) pairs. *HBase* runs on *HDFS* with *Hadoop Map/Reduce* to store and process big data. *HBase* and *Hadoop* have been adopted dramatically for the enterprise computing because business world always has the big data such as log files for web transactions, which is not easy to store and compute. Especially, when *Amazon AWS* supports *Hadoop* instances, it becomes much easy for people to run

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