

E1

The paper indicates that there's a problem that exists in Amazon's system that continuous failures in the infrastructure should be handled properly. Because the scalability and reliability is very important to system and towards user experience for large-user scale system such as Amazon. Today, user experience is the most part in user-interact system, for example, any minor error can cause significant financial consequences and negative influence on customers. Such as you cannot make payment, or payment is missed. These would cause serious damage to revenue. The traditional RDBMS has low efficiency and high cost with complex query model and a higher priority on consistency over availability. Therefore, minor delay would multiply by customer numbers and become a large black hole to cause whole system idle. The solution proposed in the paper is building a highly available key-value storage system called Dynamo.

In short, Dynamo simplifies some settings of RDBMS. It uses key-value instead of complex models to manage data. Since it decreases the consistency level from always consistent to eventually-consistent, the system adopts Service Level Agreement to handle the communication between clients and services. Dynamo is designed to be "always writable" by moving the conflict resolution from writes to reads, thus it provides a non-waiting experience for customer view. Also, it has other designs called incremental scalability which means Dynamo can scale out one node at a time, symmetry, decentralization and heterogeneity. Plus its partitions and replications of keys are hashed in a fixed circular space called Dynamo ring. Those key factors make the Dynamo a system that is eventually-consistent. There may be multiple versions of data which keep distinct version sub-histories of the system to reconcile in the future. The solution is using vector clocks to capture causality between different versions. The designers of Dynamo tried several strategies to ensure the uniform load distribution, and finally adopts Q/S tokens per node strategy which takes equal-sized partitions. The system handles failures by hinted handoff.

The article clearly provided an eventually-consistent system can be adopted in the production. Though it provides limit guarantees, it provides high performance and better experience which is guaranteed to improve customer experience. Also, different from traditional database, it resolves the conflicts in reads instead of the writes to improve the customer experience since people love to be able to make any actions and get response immediately. The idea is very particular to a shopping website like Amazon. The Dynamo is also presented it is very professional and highly customizable.

E2

With the development of technologies, a lot of applications served as endless stream in common scene. Thus, there's an indeed demand for fast, secure, and flexible solutions across platforms. Cloud Computing as the most valuable and suitable category of technology becomes hottest technology today. This article examines the database, in general, data storage technology specific for cloud computing.

The article introduced the development of cloud computing, which showed us the new requirements compared with traditional RDBMSs, and then clarified the concepts of NoSQL and NewSQL data stores.

Plus, the author discussed the difference between data models, such as key-value stores, column-family stores, document stores, graph databases and NewSQL data stores. Moreover, the author analyzed the ability of data querying and scaling. In article, author indicated that it is not only because querying capabilities of data stores play an very important role in choosing but also scaling capabilities are main characteristics when you are choosing from different data stores models. In article, author also stated that security aspect is also different between those data stores. Last but not least, the author discussed the template that helps us to know where NoSQL and NewSQL data stores should be used.

In conclusion, this paper examine the difference between traditional database and cloud-oreinted databases. Gave us a clean view of data stores in new cloud computing environment.