**Review:** [**Bigtable: A Distributed Storage System for Structured Data**](http://research.google.com/archive/bigtable-osdi06.pdf)

[**Dynamo: Amazon's highly available key-value store**](http://dl.acm.org/ft_gateway.cfm?id=1294281&ftid=463732&dwn=1&CFID=64943080&CFTOKEN=14416523)

Tian Guo

tian.guo@epfl.ch

**Summary.** This report summarizes the papers [FaJdG06] and [DhMj07] about cloud computing’ s origin, trend, technical obstacles and promising architecture.

The paper [FaJdG06] gave complete introduction of Bigtable, the distributed storage system for structured data adopted and designed by Google. One chief feature of Bigtable is that it gives clients dynamic control over data layout and format. Bigtable defines a structured data model for storage map. The implementation of Bigtable comprises three components: library linked into every client, one master server and many tablet servers. Bigtable designs a novel three-level hierarchy storage framework.

The gist of paper [DhMj07] is to presents the design and implementation of Dynamo, a highly available key-value storage system that Amazon desires to make use of to provide “always on” experience. Compared with traditional database which puts great focus on realizing the atomicity, consistency, isolation and durability for any transaction, Dynamo targets applications that operate with weaker consistency if this results in high availability. Moreover, Dynamo express and measure SLA at the 99.99th percentile of the distribution to offer a good customer experience. Regarding the implementation, in order to maintain high availability, Dynamo makes novel designs on partition, replication and data versioning parts. Dynamo has provided the desired levels of availability and performance and made success in coping with kinds of failures.

**Strong points**

Some advantages of these papers are listed as the following.

1. In paper [FaJdG06], the Bigtable implementation has three major components: a library that is linked into every client, one master server, and many tablet servers. Tablet servers can be dynamically added from a cluster to accommodate changes in workloads.
2. Dynamo is used to manage the state of services that have very high reliability requirements and need tight control over the tradeoffs between availability, consistency, cost-effectiveness and performance.
3. Dynamo uses a variant of consistent hashing that each node gets assigned to multiple points in the ring.

**Weak points**

In the following, a couple of points that we find weak are introduced:

1. In Bigtable, the paper didn’t discuss clearly the mechanism in which the tablet server tracks the state of every tablet.

2.Dynamo didn’t specify in which situation the availability is more important than other attributes of database.

3. The Dynamo only considers the balance between consistency and availability and didn’t talk about the tradeoffs between availability between isolation or durability.

**References**

[FaJdG06] Fay Chang, Jeffrey Dean, Sanjay Ghemawat, Wilson C. Hsieh, Deborah A. Wallach, Mike Burrows,Tushar Chandra, Andrew Fikes, and Robert E. Gruber,[Bigtable: A Distributed Storage System for Structured Data](http://research.google.com/archive/bigtable-osdi06.pdf), OSDI, 2006

[DhMj07] Deniz Hastorun, Madan Jampani, Gunavardhan Kakulapati, Alex Pilchin, Swaminathan Sivasubramanian, Peter Vosshall, Werner Vogels, [Dynamo: Amazon's highly available key-value store](http://dl.acm.org/ft_gateway.cfm?id=1294281&ftid=463732&dwn=1&CFID=64943080&CFTOKEN=14416523), SOSP, 2007