Bigtable: A Distributed Storage System for Structured Data

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Main Idea

- BigTable is a distributed storage system for managing structured data.
- Designed to scale to a very large size
  - Petabytes of data across thousands of servers
- Used for many Google projects
  - Web indexing, Google Earth, Google Finance, …
- Flexible, high-performance solution

Implementation

- A library is linked into every client
- One master server that :
  - Garbage collection of files in Google File System
  - Metadata Operations
  - Assigns tablets to tablet servers
  - Detects addition and expiration of tablet servers
  - Balances tablet-server load
- Many Tablet servers
  - Chubby, Root tablet, METADATA
  - Tablet servers handle read and write requests to its table
  - Splits tablets that have grown too large

Analysis of idea & implementation

- Smart idea and simple to use
- Easy to understand major components of implementation
- Much more advantages than disadvantages
- One commit log per tablet as opposed to one log per tablet server seems like a good idea

Advantages & disadvantages

Advantages

- Simple
- Dynamic control of layout and format of data
- Millions of reads/writes per second, efficient scans
- Self managing
- Fault tolerant
- No query language needed

Disadvantages

- Data loss can occur
- Lack of advanced data security
- Possibilities of copied data
- Does not support secondary index

Real-world use case scenarios

- Google Analytics
  - Analyze traffic patterns
  - Uses 2 tables
- Google Earth
  - Set of tables for serving client data but one table to process data
  - Uses 2 tables