

## HYPERTABLE: OVERVIEW

Hypertable is a high performance, open source, massively scalable database modeled after Bigtable, Google's proprietary, massively scalable database.

### COMPARISON TO A RELATIONAL DATABASE

Hypertable is similar to a relational database in that it represents data as tables of information, with rows and columns, but that's about as far as the analogy goes. The following is a list of some of the main differences

- Row keys are UTF-8 strings

- No support for data types, values are treated as opaque byte sequences

- No support for joins

- No support for transactions

**HYPERTABLE SYSTEM OVERVIEW** The diagram below provides a high-level overview of the Hypertable system followed by a brief description of each system component.

**Hyperspace** - This is Hypertable's equivalent to Google's Chubby service. Hyperspace is a highly available lock manager and provides a filesystem for storing small amounts of metadata. Exclusive or shared locks may be obtained on any

created file or directory. High availability is achieved by running in a distributed configuration with replicas running on different physical machines. Consistency is achieved through a distributed consensus protocol. Google refers to Chubby as, "the root of all distributed data structures" which is a good way to think of this system.

**Master** - The master handles all meta operations such as creating and deleting tables. Client data does not move through the Master, so the Master can be down for short periods of time without clients being aware. The master is also responsible for detecting range server failures and re-assigning ranges if necessary. The master is also responsible for range server load balancing. Currently there is a single Master process, but high availability is achieved through hot standbys.

**Range Server** - Range servers are responsible for managing ranges of table data, handling all reading and writing of data. They can manage up to potentially thousands of ranges and are agnostic to the set of ranges that they manage or the tables of which they're a part. Ranges can move freely from one range server to another, an operation that is mostly orchestrated by the Master.

**DFS Broker** - Hypertable is capable of running on top of any filesystem. To hypertable database. achieve this, the system has abstracted the interface to the filesystem by sending all filesystem requests through a Distributed File System (DFS) broker process. The DFS broker provides a normalized filesystem interface and translates normalized filesystem requests into native filesystem requests and vice-versa. DFS brokers have been developed for HDFS, MapR, Ceph, KFS, and local (for running on top of a local filesystem).

**The dependency diagram shown below is made by using Microsoft Visual Studio Ultimate 2013**

The main.cc file shown in the dependency diagram is the main of rangesserver system in hypertable that is capable of Managing ranges of table data,handling all reading and writing of data.In this graph there are total 50 files and 101 links .Those 50 files are the main files of the rangesserver system responsible for it's working in

