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**Class 2—Google GFS-SOSP 2003**

This reading was written by Google engineers in 2003 to discuss the Google File System. Google handles a large amount of data, in different components of its large and varied platform, which it must store. As such, Google has created the Google File System (GFS) which addresses three long-term problems in a scalable manner:

1. Platform component failures are the norm, not the exception
2. Files are large and will likely get larger
3. Mutate files by appending new data rather than modifying the file directly
4. Co-design of the application and GFS API increases overall flexibility

In the control flow of GFS, the client first asks the server where the file is which the client wants to read/modify/write. The server then, under the hood, engages the GFS master, which keeps track of the GFS chunkservers. These chunkservers allow for data to be packaged together for ease of availability, network efficiency, meta data efficiency, and a handful of other advantages. There are a number of replica chunkservers which are created and tracked through the GFS master as the user and or the system deems fit. These replicas are created for chunk creation, re-replication, and rebalancing.

Organizing the data like this allows Google to take full GFS systems and take Snapshots—a process which allows for large datasets to be copied or stored very efficiently. These process attain their efficiency because the GFS master server is keeping track of only the changes to the initial data volume. That means, if the same disk with the original dataset is still available, a new instance of a GFS master server can be stood up with the same log of changes and reconnect to the same immutable disk.