EXHIBIT 2051

Challenged Claims of '494 Patent (numerical)	Evidence of Infringement – Google's Search Engine that uses
18. A method of analyzing a database having objects and a first numerical representation of direct relationships in the database, comprising the steps of:	**Google's Software includes methods of analyzing databases (o databases) related to the World Wide Web and other hyperme Google obtains and stores information concerning the link stru** Google uses its database of links to create an adapted adjacency calculation of the PageRank algorithm. These matrices map the each web page on the Web. <mark>Ex.</mark> 2099: Langville, Amy and Mey *PageRank and Beyond: The Science of Search Engine Rankings,* University Press 2006). Google's adapted adjacency matrices (c constitute a first numerical representation of direct relationships in Google's Software includes methods of analyzing databases to of direct relationships between objects. Google obtains and concerning the hyperlink structure of the Web in a links database. To implement PageRank, the web crawler simply needs to b links as it crawls." <mark>Ex.</mark> 2054: *The PageRank Citation Ranking: Bringing Order to* The citation (link) graph of the web is an important resource gone unused in existing web search engines. We have created as many as 518 million of these hyperlinks, a significant sampl <mark>Ex.</mark> 2053: *The Anatomy of a Large-Scale Hypertextual Web S* 2.1.

EXHIBIT 2051

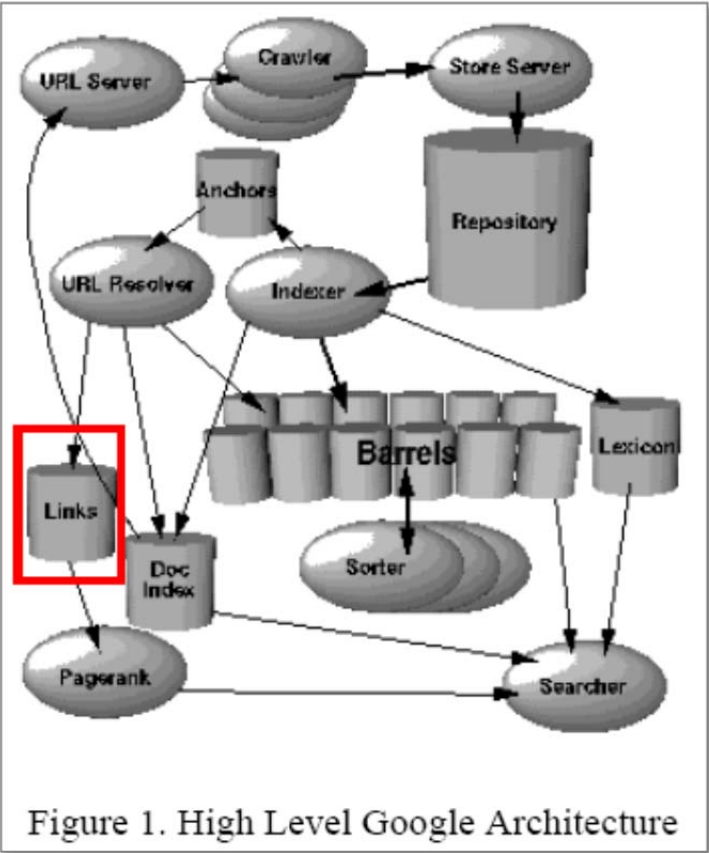| Challenged Claims of '494 Patent (numerical)	Evidence of Infringement – Google's Search Engine that uses PageRank
18. A method of analyzing a database having objects and a first numerical representation of direct relationships in the database, comprising the steps of:	**Google's Software includes methods of analyzing databases (or a copy of such databases) related to the World Wide Web and other hypermedia databases. Google obtains and stores information concerning the link structure of the web:** Google uses its database of links to create an adapted adjacency matrix for use in the calculation of the PageRank algorithm. These matrices map the direct links between each web page on the Web. Ex. 2099: Langville, Amy and Meyer, Carl D, *Google's PageRank and Beyond: The Science of Search Engine Rankings,* at 31-52 (Princeton University Press 2006). Google's adapted adjacency matrices (or derived databases) constitute a first numerical representation of direct relationships in the database. Google's Software includes methods of analyzing databases to build representations of direct relationships between objects. Google obtains and stores information concerning the hyperlink structure of the Web in a links database. To implement PageRank, the web crawler simply needs to build an index of links as it crawls." Ex. 2054: *The PageRank Citation Ranking: Bringing Order to the Web* at 6. The citation (link) graph of the web is an important resource that has largely gone unused in existing web search engines. We have created maps containing as many as 518 million of these hyperlinks, a significant sample of the total. Ex. 2053: *The Anatomy of a Large-Scale Hypertextual Web Search Engine*, at 2.1.

EXHIBIT 2051

Challenged Claims of '494 Patent (numerical)	Evidence of Infringement – Google's Search Engine that uses PageRank
	The indexer performs another important function. It parses out all the links in every web page and **stores** important information about them in an anchors file. This file contains enough information to determine where each link points from and to, and the text of the link. Ex. 2053: *The Anatomy of a Large-Scale Hypertextual Web Search Engine*, at 4.1 (emphasis added) It also generates a database of links which are pairs of docIDs. The links database is used to compute PageRanks for all the documents. Ex. 2053: *The Anatomy of a Large-Scale Hypertextual Web Search Engine*, at 4.1. *See also id.* at 4.1 fig.1 (red box added) below:

EXHIBIT 2051

Challenged Claims of '494 Patent (numerical)	Evidence of Infringement – Google's Search Engine that uses PageRank
	Figure 1. High Level Google Architecture

The first numerical representation is stored.

"The indexer performs another important function. It parses out all the links in every web page and **stores** important information about them in an anchors file.

3

EXHIBIT 2051

Challenged Claims of '494 Patent (numerical)	Evidence of Infringement – Google's Search Engine that uses PageRank
	… The URLresolver reads the anchors file … It also generates a database of links which are pairs of docIDs. The links database is used to compute PageRanks for all the documents." *The Anatomy of a Large-Scale Hypertextual Web Search Engine*, at 4.1 (emphasis added).

Storage Statistics	
Total Size of Fetched Pages	147.8 GB
Compressed Repository	53.5 GB
Short Inverted Index	4.1 GB
Full Inverted Index	37.2 GB
Lexicon	293 MB
Temporary Anchor Data (not in total)	6.6 GB
Document Index Incl. Variable Width Data	9.7 GB
Links Database	3.9 GB
Total Without Repository	**55.2 GB**
Total With Repository	**108.7 GB**

Ex. 2053: *The Anatomy of a Large-Scale Hypertextual Web Search Engine*, at

4

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