EXHIBIT 2050

Challenged Claims of the '352 Patent	Evidence of Infringement – Google's Search Engine that uses
26. A non-semantical method for numerically representing objects in a computer database and for computerized searching of the numerically represented objects in the database, wherein direct and indirect relationships exist between objects in the database, comprising:	**Google's search engine that uses PageRank is a non-semantic numerically representing objects with direct and indirect rela database and for computerized searching of the numerically objects:** Google's search engine that uses PageRank is a non-semantical n numerically representing web pages of the World Wide Web and objects that have indirect relationships and for computerize searc numerically represented objects. *See* Ex. 2075 and 2076: http://www.google.com/technology/. The method as disclosed in 8,631,094 uses a link table representing direct and indirect relatio to process "queries [...] received from client devices [...] such as computing devices, mobile communication devices, set-top box t devices, and so on" and does not use or account for words or phra '094 Patent abstract; 15:14-19, 42-47; 17:43-20-40. Web pages have direct and indirect relationships with othe hyperlink citations between web pages. Google's papers on Pa that hyperlinks are a form of citation. *See* Ex. 2053: *The Anatom Hypertextual Web Search Engine* at 2.1 ("The citation (link) grap important resource that has largely gone unused in existing web s have created maps containing as many as 518 million of th Indeed, Larry Page, the creator of PageRank algorithm, refer "citation ranking" in the title of his work on PageRank. *S PageRank Citation Ranking: Bringing Order to the* Web at 1.

Challenged Claims of the '352 Patent	Evidence of Infringement – Google's Search Engine that uses PageRank
26. A non-semantical method for numerically representing objects in a computer database and for computerized searching of the numerically represented objects in the database, wherein direct and indirect relationships exist between objects in the database, comprising:	**Google's search engine that uses PageRank is a non-semantical method for numerically representing objects with direct and indirect relationships in a database and for computerized searching of the numerically represented objects:** Google's search engine that uses PageRank is a non-semantical method for numerically representing web pages of the World Wide Web and other similar objects that have indirect relationships and for computerize search of the numerically represented objects. *See* Ex. 2075 and 2076: http://www.google.com/technology/. The method as disclosed in US Patent 8,631,094 uses a link table representing direct and indirect relationships and nodes to process "queries […] received from client devices […] such as mobile computing devices, mobile communication devices, set-top box television client devices, and so on" and does not use or account for words or phrases. *See* Ex. 2085: '094 Patent abstract; 15:14-19, 42-47; 17:43-20-40. Web pages have direct and indirect relationships with other objects through hyperlink citations between web pages. Google's papers on PageRank recognize that hyperlinks are a form of citation. *See* Ex. 2053: *The Anatomy of a Large-Scale Hypertextual Web Search Engine* at 2.1 ("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."). Indeed, Larry Page, the creator of PageRank algorithm, refers to PageRank as "citation ranking" in the title of his work on PageRank. *See* Ex. 2054: *The PageRank Citation Ranking: Bringing Order to the* Web at 1.

Challenged Claims of the '352 Patent	Evidence of Infringement – Google's Search Engine that uses PageRank
	Google's PageRank patent describes its analysis of the world wide web as a method that analyzes a database: "A method assigns importance ranks to nodes in **a linked database**, such as any database of documents containing citations, **the world wide web** or any other hypermedia database." Ex. 2086: Abstract U.S. Patent No. 6,285,999. PageRank numerically represents web pages and other similar objects that have indirect relationships by assigning each web page or object a unique numerical identifier: "We convert each URL into a unique integer, and store each hyperlink in a database using the integer IDs to identify pages." Ex. 2054: *The PageRank Citation Ranking: Bringing Order to the Web* at 3.1 The purpose of Google's PageRank algorithm is to facilitate searches of World Wide Web and other similar document databases that have indirect relationships among the objects within the database. *See* Ex. 2054: *The PageRank Citation Ranking: Bringing Order to the Web*, abstract ("[w]e show how to apply PageRank to search and to user navigation [of web pages]").
marking objects in the database so that each marked object may be individually identified by a computerized search;	Google's PageRank algorithm marks objects in the database by assigning a unique numerical identifier to each web page or object: "We convert each URL into a unique integer, and store each hyperlink in a database using the integer IDs to identify pages." Ex. 2054: *The PageRank*

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	Citation Ranking: Bringing Order to the Web at 3.1 Google's algorithm assigns unique numerical identifiers to each web page or object so objects associated with each assigned identifier may be identified by a computerized search: "Additionally, there is a file which is used to convert URLs into docIDs. It is a list of URL checksums with their corresponding docIDs and is sorted by checksum. In order to find the docID of a particular URL, the URL's checksum is computed and a binary search is performed on the checksums file to find its docID. URLs may be converted into docIDs in batch by doing a merge with this file. This is the technique the URLresolver uses to turn URLs into docIDs. This batch mode of update is crucial because otherwise we must perform one seek for every link which assuming one disk would take more than a month for our 322 million link dataset." Ex. 2053: *The Anatomy of a Large-Scale Hypertextual Web Search Engine* at 4.2.3.
creating a first numerical representation for each identified object in the database based upon the object's direct relationship with other objects in the database;	Google's PageRank algorithm creates a first numerical representation for each object based on the object's direct relationship with other objects in the database: Google uses its database of links to create a link matrix for use in the calculation of the PageRank algorithm. *See* Ex. 2053: *The Anatomy of a Large-Scale Hypertextual Web Search Engine* at 2.1.1. Both the database of links and the link matrix are numerical representations of direct relationships expressed by hyperlinks.

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	The database of links is a numerical representation: "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. "Every web page has an associated ID **number** called a docID which is assigned whenever a new URL is parsed out of a web page." Ex. 2053: *The Anatomy of a Large-Scale Hypertextual Web Search Engine* at 4.1. PageRank also is generated using a link matrix which is a numerical representation of direct relationships: "PageRank or PR(A) can be calculated using a simple iterative algorithm, and corresponds to the principal eigenvector of the normalized link matrix of the web" Ex. 2053: *The Anatomy of a Large-Scale Hypertexual Web Search Engine* at 2.1.1. This link matrix is further described as: "Stated another way, let A be a square matrix with the rows and column corresponding to web pages. Let $A_{u;v} = 1=N_u$ if there is an edge [i.e., link] from u to v and $A_{u;v} = 0$ if not. If we treat R as a vector over web pages, then we have R = cAR. So R is an eigenvector of A with eigenvalue c. In fact, we want the dominant eigenvector of A. It may be computed by repeatedly applying A to any nondegenerate start vector." *See* Ex. 2054: *The PageRank Citation Ranking:*

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