IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

NORTHEASTERN UNIVERSITY and JARG CORPORATION **Plaintiffs,** **v.** **GOOGLE INC.** **Defendant.**	**Case No. 2:07-CV-486-CE**

PLAINTIFFS NORTHEASTERN UNIVERSITY AND JARG CORPORATION'S OPENING CLAIM CONSTRUCTION BRIEF

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Exhibits

A. Exhibit U.S. Patent 5,694,593

B. Joint Claim Construction and Prehearing Statement (Docket No. 62)

C. Abridged version of the Prosecution History for U.S. Patent 5,694,593

D. Webster's Third New International Dictionary of the English Language (Phillip Babcock Gove ed., 1993)

E. Encyclopedia of Computer Science and Engineering (Anthony Ralston & Edwin D. Reilly, Jr. eds., 1983)

F. Robert A. Edmunds, The Prentice-Hall Standard Glossary of Computer Terminology, (1985)

G. IBM Dictionary of Computing (George McDaniel ed., 10th ed. 1994)

H. Alok R. Chaturvedi *et al*., *Scheduling the Allocation of Data Fragments in a Distributed Database Environment: A Machine Learning Approach*, 41 IEEE Transactions on Eng'g Mgmt 194, 195 (1994)

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I. INTRODUCTION

A. Dr. Ken Baclawski's Distributed Search Engine

In 1994, Dr. Ken Baclawski, a faculty member at Northeastern University, foresaw the need for information search and retrieval systems to scale up and search millions of documents, millions of times a day.[1] To make this possible, he invented a new distributed search engine that indexed vast numbers of documents and searched them quickly. The search engine is distributed: it spreads the computational work needed to search such large numbers of documents across many computers.[2] Dr. Baclawski and Northeastern University filed a patent application claiming this distributed search engine in October of 1994. That application issued as U.S. Patent No. 5,694,593 in December of 1997. Defendant Google was first incorporated nearly a year later, on September 4, 1998.

One of the distinguishing features of the patented system is the way it distributes users' queries of the data stored in the system. To respond to a query from a user, the search engine takes the query and breaks it apart into pieces or fragments which are distributed to processing nodes called "query nodes." Those query nodes then search for data corresponding to each query fragment.[3] An important aspect of Dr. Baclawski's invention is that the query fragments themselves indicate which query nodes store the data needed to answer the query.[4] In this manner, Dr. Baclawski's system efficiently distributes the workload for handling users' queries, so that many computer nodes can process queries simultaneously. Not only does this allow the search engine to search massive numbers of documents quickly, but also it allows the system to handle many simultaneous user queries.

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[1] U.S. Patent No. 5,694,593, col. 1, ll. 54-61 ("the '593 patent," attached as Ex. A).
[2] *Id.*, col. 1, l. 65-col. 2, l.2.
[3] *Id.*, col.2, ll. 12-15.
[4] *Id.*, col. 2, ll. 8-11.

B. The Asserted Claims of the ’593 Patent

In November of 2007, Northeastern University, and its licensee, Jarg Corporation (collectively, “Northeastern”), filed a complaint alleging that Google Inc. (“Google”) infringes the ’593 patent. Northeastern’s initial infringement contentions, served in September of 2008, set out that Google’s Web Search service infringes claims 1, 2, 3, 8, 9, and 13 of the ’593 patent. Northeastern has since requested leave to supplement its initial contentions to accuse the specific backend systems running Google’s Web Search service and several related services. Those supplemental contentions also assert infringement of claims 1, 2, 3, 8, 9, and 13.

The asserted claims are all directed to systems and methods for retrieving information from a distributed database system. Claim 8 is representative:

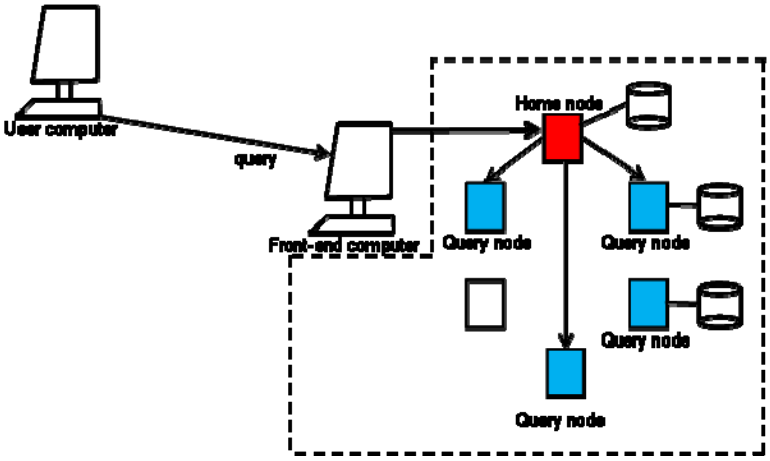
> 8. A non-relational, distributed database system having an information retrieval tool for handling queries from a user, comprising:
>
> a plurality of home nodes; and
>
> a plurality of query nodes;
>
> said plurality of home nodes and said plurality of query nodes connected by a network,
>
> wherein each said home node, upon receiving a query from a user, fragments said query into a plurality of query fragments, hashes each said query fragment of said plurality of query fragments into a hashed query fragment having a first portion and a second portion, and transmits each said hashed query fragment to a respective one of said plurality of query nodes indicated by said first portion of said hashed query fragment, and
>
> further wherein each said query node uses said second portion of said hashed query fragment to access data according to a local hash table located on said query node and returns an object identifier corresponding to said accessed data to said home node.

Among other things, the remaining asserted claims add features relating to load balancing and determining the relevance of the results. For example, claim 1 recites distributing queries by

randomly selecting the home node. Dependent claims 3 and 9 relate to returning results with a certain degree of relevance.

C. Query Processing in the '593 Patent

Because the asserted claims all relate to processing user queries in a distributed database, a brief explanation of how users' queries are handled in embodiments of the '593 patent is helpful for understanding and resolving the claim construction disputes argued below.



The figure above is adapted from Fig. 1 of the '593 patent, with some components removed and labels and color added for clarity. The figure depicts a user computer, a front-end computer, and two kinds of nodes—home nodes (in red) and query nodes (in blue). The home nodes are responsible for the initial distribution of the user's query in the search engine, while the query nodes actually match the query to the data stored in system.

The figure shows the front-end computer receiving a user query and forwarding it to a home node. After receiving the query, the home node breaks it into parts (query fragments), and performs a transformation called hashing[5] on each query fragment to produce hashed query fragments. Next, the home node transmits the hashed query fragments to query nodes, as seen

[5] The parties dispute the meaning of "hashes" or "hashing" in the claims. As set out below, the parties appear to agree "hashing" means, *at least*, transforming one set of values into another.

by the arrows between the home node and the query nodes. The home node uses a portion of the hashed query fragment itself to determine which query node will receive the fragment.

Once the hashed query fragment arrives at a query node, the query node uses another portion of the hashed query fragment to identify data matching the information requested by the user. The query node gathers identifiers for the relevant documents and returns the matching object identifiers to the home node.

D. The Disputed Terms for Construction

The parties dispute the appropriate scope for eleven terms and phrases from the six asserted claims. Specifically, Northeastern believes six claim terms will benefit from further construction by the Court:

- non-relational, distributed database system (claims 1, 8, 13)
- randomly selecting (claim 1)
- query fragment (claims 1, 8, and 13)
- hashing / hashes (claims 1, 8, and 13)
- local hash table (claims 1, 8, and 13)
- predetermined degree of relevance (claims 3 and 9)

In addition to these terms, Defendant requests construction of five more phrases:

- a plurality of home nodes and a plurality of query nodes connected by a network (claim 1, with similar passages in claims 8 and 13)
- a first portion and a second portion (claims 1, 8, and 13)
- transmitting by said selected home node, each said hashed query fragment of said plurality of query fragments to a respective one of said plurality of query nodes indicated by said first portion of each said hashed query fragment (claim 1, with similar passages in claims 8 and 13)
- using, by said query node, said second portion of said respective hashed query fragment to access data according to a local hash table located on said query node (claim 1, with similar passages in claims 8 and 13)

- returning, by each said query node (claim 1, with similar passages in claims 8 and 13)

No further construction of these phrases is needed to clarify their meaning.

II. APPLICABLE LEGAL STANDARDS FOR CLAIM CONSTRUCTION

Claim terms are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art at the time of invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc). In order to arrive at this understanding, the Court should consider "the claims themselves, the remainder of the specification, [and] the prosecution history." *Id.* at 1314 (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Systems, Inc,* 381 F.3d 1111, 1116 (Fed. Cir. 2004)). The context in which claim terms are used can provide substantial guidance regarding the meaning of the terms. *Id.* In addition to the claims, the specification "is always highly relevant to the claim construction analysis," and, indeed, may be the "single best guide to the meaning" of a claim term. *Vitronics Corp. v. Conceptronic, Inc*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). The prosecution history should also be considered as evidence of "how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution." *Phillips*, 415 F.3d at 1317. Beyond the intrinsic evidence of the claims, specification, and prosecution history, the Court may also consider extrinsic evidence during claim construction to help establish the meaning of claim terms to those of skill in the art. *Id.* at 1318.

One of the ways that the specification is particularly helpful in guiding claim construction is through the specification's description of the preferred embodiments of the invention. Interpretations of the claims that exclude a preferred embodiment from the scope of the claims are "rarely, if ever, correct" and must be established with "highly persuasive evidentiary support." *Vitronics*, 90 F.3d at 1583; *see also Oatley Co. v. IPS Corp.*, 515 F.3d 1271, 1276

(Fed. Cir. 2008) ("We normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification.").

While the specification and the embodiments it describes should be used to interpret the claims, importing limitations from the specification into the claims is improper. As the Federal Circuit recognized in *Phillips*, "persons of ordinary skill in the art rarely . . . confine their definitions of terms to the exact representations depicted in the embodiments" disclosed in the specification. *Id.* at 1323. Generally, the specification itself will make apparent whether a patentee intended an embodiment to merely represent an example of a claim term as opposed to defining it. *Id.*; *see also SuperGuide v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) ("[A] particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment."). Generally speaking, the Court should avoid importing limitations into the claim where the claim language–as informed by the rest of the intrinsic record–is clear on its face. *Phillips*, 415 F.3d at 1312-13.

Similarly, the Court should also exercise caution before importing limitations into the claims from the prosecution history. While the prosecution history is informative for understanding how the applicant and examiner understood the patent, "it often lacks the clarity of the specification and is therefore less useful" during claim construction. *Id.* at 1317. To that end, a "high standard" is employed in determining whether the prosecution history may be used to limit otherwise broader claim language. *North Am. Container, Inc. v. Plastipak Packaging, Inc.*, 415 F.3d 1335, 1345 (Fed. Cir. 2005). Specifically, "ambiguous" disclaimers of claim scope during prosecution will not limit a claim term's ordinary meaning. *SanDisk Corp. v. Memorex Prods., Inc.*, 415 F.3d 1278, 1287 (Fed. Cir. 2005). Instead, an applicant's statement in the prosecution history must rise to the level of a "clear and unmistakable" disclaimer before it

constitutes surrender. *Id.*; *see also Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1325-26 (Fed. Cir. 2003) (holding that absent a "clear and unmistakable" disclaimer the prosecution history does not limit the otherwise broader plain meaning of the claim language).

Finally, if the meaning of particular claim language is already clear there is no reason for the Court to rearticulate that language–and potentially import erroneous limitations–through claim construction. *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008). "Claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the determination of infringement. It is not an obligatory exercise in redundancy." *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997). For this reason, courts commonly decline a party's invitation to construe claim language that is already clear and understandable to a jury. *See, e.g., Motorola, Inc. v. VTech Commc'ns, Inc*., 2009 WL 2026317, *8 (E.D. Tex. July 6, 2009) ("[W]here additional language may be unduly limiting, confusing, or redundant, it is in a court's power to determine that no construction is necessary.").[6] Simply put, "although every word used in a claim has a meaning, not every word requires a construction." *Orion IP, LLC v. Staples, Inc.*, 406 F.Supp. 2d 717, 738 (E.D. Tex. 2005).

III. PROPOSED CONSTRUCTIONS

A. Terms Proposed by Plaintiffs

1. "non-relational, distributed database system," claims 1, 8, and 13

[6] It is, however, the Court's responsibility to resolve claim construction disputes put before it. *O2 Micro*, 521 F.3d at 1362. One way for a Court to resolve such a dispute is to reject a party's proposed construction and hold instead that the claim language itself is clear without further construction.

Northeastern's Proposed Construction	**Defendant's Proposed Construction**[7]
a database not using a relational model that is distributed among a plurality of interconnected computer nodes	a database, stored across multiple computers on a network, ***wherein data objects exist independently of their attribute values, and wherein data is not extracted using relational algebra***

The parties appear to agree that this phrase refers to a database distributed across a network of computer nodes. The dispute concerns the meaning of "non-relational." Northeastern's proposed construction is drawn from the intrinsic record, and it reflects the plain and ordinary meaning of the term "non-relational, distributed database system" as commonly understood in the art. Defendant's proposed construction erroneously imports two additional "wherein" limitations not found anywhere in the claims.

The claim language requires a "non-relational" database. As evidenced by the many dictionary definitions cited by the Defendant, "relational" is a common type of database model that is well known and understood by those of skill in the art. *See* P.R. 4-3 Joint Claim Construction and Prehearing Statement [Dkt. No. 62] (attached as Ex. B). As would be expected for such a well-known term stated in the negative, the plain meaning of "non-relational" is to specify that the system is limited to a database that is not "relational" *i.e.*, a database that does not use a relational model.

The prosecution history confirms that "non-relational" means that the claimed invention does not use a relational model. For example, in one of its early office action responses, the applicant plainly stated that "[t]he present invention does not utilize the relational model." *See* Amendment and Remarks, dated June 7, 1996, at 10 [hereinafter First Office Action Response]

[7] Improper limitations or otherwise disputed language in Defendant's proposed constructions are emphasized in each of the proposed constructions.

(attached as Ex. C).[8] Later, the term "non-relational" was added to the preamble by amendment. *See* Ex. C, Amendment and Remarks, dated December 11, 1996, at 2, 4, and 5 [hereinafter Second Office Action Response]. The amendment and associated remarks were made to distinguish a relational database in a reference. In doing so, the applicant recited some characteristics of relational databases, including, among others:

- "relational database systems consist of relations"
- "each record in a relation has exactly the same number of fields, and the fields have the same types"
- "relational database queries are expressed in a relational algebra and records are expressed in other ways."

Ex. C, Second Office Action Response, at 8. These characteristics resemble portions of the descriptions of "relational databases" in the various dictionaries cited by the parties. They would typically be found in a relational database. However, there is nothing in the prosecution history to suggest that a "non-relational" database must exclude all characteristics that are common to a relational database. In other words, a non-relational database might have features in common with a relational database, and applicants did not disclaim non-relational databases that include such common features.

Defendant's construction is erroneous because it cherry-picks from statements in the prosecution history describing "relational databases" and uses those statements to import negative limitations into the term "non-relational." Specifically, Defendant imports the following two "wherein" limitations into the term "non-relational": (i) "wherein data objects exist independently of their attribute values," and (ii) "wherein the data is not extracted using relational algebra." These "wherein" limitations were apparently derived from statements in the

[8] Ex. C is an abridged version of the prosecution history, which includes only the substantive Office Actions and responses. Copies of the cited references and other miscellaneous documents have been omitted.

prosecution history, like the ones discussed above, which describe some of the general characteristics of relational databases. *See, e.g.,* Ex. C, Second Office Action Response, at 8 (stating, among other things, "relational database queries are expressed in relational algebra"). These passages do not redefine the plain and ordinary meaning of the actual claim term "non-relational." Nor are they a clear and unmistakable disavowal of databases that may share some characteristics in common with a relational database, but nonetheless still be considered to not use a relational model. As such, Defendant cannot overcome the "heavy presumption" in favor of the plain meaning, particularly where—as here—the prosecution history affirmatively supports such a plain meaning. *Motorola,* 2009 WL 2026317, at *5 (citing *Johnson Worldwide Assocs., Inc. v. Zebco Corp*., 175 F.3d 985, 989 (Fed. Cir. 1999)).

Finally, with respect to the distributed portion of the term, Northeastern's proposed construction, "distributed among a plurality of interconnected computer nodes," adheres to the language of the claims, specification, and prosecution history. While Defendant's proposal is similar, it fails in at least one material respect: omitting the term "node" from the construction. As recited in the claims, the components of the system are "nodes." The components of the search engine are consistently described as "nodes" or "computer nodes" throughout the patent. *See, e.g.,* '593 patent, at Abstract, col. 1 l. 65–col. 2 l. 17 and col. 2 l. 66-col. 3 l. 25.

2. "randomly selecting," claim 1

Northeastern's Proposed Construction	**Defendant's Proposed Construction**
selecting without an apparent pattern	selecting ***by chance, independently of preceding selections***, where ***each item in the set has equal probability of being chosen***

Northeastern's construction for "randomly selecting" relies on the plain, ordinary meaning of the term "random." *See* Webster's Third New International Dictionary of the English Language, 1880 (Phillip Babcock Gove ed., 1993) (defining random as "lacking *or*

seeming to lack a regular plan, purpose, or pattern") (emphasis added) (attached as Ex. D). Nothing in the claims, specification, or prosecution history contradicts that understanding.

"Randomly selecting" was added to claim 1 during prosecution to specify how the home node was selected during query processing. Ex. C, First Office Action Response, at 2. In the remarks supporting the amendment, the patentee explained "the home node of a query is randomly chosen, and different queries will generally have different home nodes." *Id.* at 13. This use of the term "random" evidences the plain, ordinary meaning of the term: the home node is randomly selected to distribute the incoming users' queries across the home nodes.

Defendant's proposed construction requires selecting "by chance." Importantly, in computer programming, "random" does not mean by pure chance. Computers operate according to prescribed algorithms that dictate their operation. This is true even though the results of those prescribed algorithms may appear random. For example, when a computer generates random numbers, the computer uses a process that only "simulates chance." The New IEEE Standard Dictionary of Electrical and Electronics Terms 1064 (Christopher Booth, ed., Inst. of Electrical & Electronics Engineers, Inc., 5th ed., 1991) in Ex. B, Def.'s Proposed Constructions and Evidentiary Support, at 9. Thus, Defendant's proposed construction, which requires selecting "by chance" is contrary to the plain and ordinary meaning of the term "random" as applied to computer systems.

Defendant's construction also erroneously imports two additional limitations not found in the claims, specification, or prosecution history: (i) "independently of preceding selections," and (ii) "where each item in the set has equal probability of being chosen." Importantly, these limitations are not necessary—nor commonly assumed—characteristics of the plain and ordinary meaning of the term "random." For example, as playing cards are drawn from a deck, the odds

of drawing a particular card from what's left in the deck change. The exact odds of drawing an ace, for example, *depend* on what cards have already been drawn. Moreover, if the first card drawn from the deck is an ace, then there is *not an equal probability* between drawing an ace and another type of card, because only three aces are left in the deck. Nonetheless, the identity of the next card is still "randomly selected" as it is drawn from the deck.

Apparently not content with the plain and ordinary meaning of this term, Defendant is attempting to import additional limitations into the claims to distinguish its infringing systems. This is because, from a user's perspective, there is no apparent pattern to the selection of the home node in Defendant's accused systems. But in reality, as in all computer-driven systems, the actual selection is made based on algorithms. Presumably, Defendant selects its home nodes based, at least in part, on how preceding selections were made, and now seeks to import a limitation that would exclude its system from the claims. But the claims do not require either an "independent" or "uniform" distribution to the home nodes such as would occur if there was an equal probability of selecting any particular home node each time a home node is selected. Indeed, the specification makes clear that when a uniform distribution was desired, the patentee expressly described it as so. *See* '593 patent, col. 3 ll. 31-36 (describing the use of a hashing function to *uniformly* distribute data and queries over the query nodes of the search engine). Furthermore, there is no clear redefinition or disavowal of the plain and ordinary meaning of the term "randomly selected" anywhere in the intrinsic record that changes the meaning of "randomly" to require uniformity. Defendant's proposed construction should be rejected.

3. "query fragment," claims 1, 8, and 13

Northeastern's Proposed Construction	Defendant's Proposed Construction
a sub-part or piece of a query	a part of a query ***consisting of a limited number of attributes and attribute values joined by relationships, specified in the same formal, artificial language and ontology which describes the attribute values of objects of the database***

The parties agree to the extent that a "query fragment" is simply a smaller part of the original query. This construction is consistent with the plain and ordinary meaning of the term "fragment." *See* Ex. D, Webster's, *supra*, at 901 (defining fragment as "a part broken off : a small detached portion : an imperfect or incomplete part"). This is also how the specification uses the term. For example, the specification describes how the query fragments are generated from a user's query, *i.e.*, the home node "divides the query into a number of (possibly overlapping) fragments or probes." '593 patent, at col. 3, ll. 25-27. It is further echoed in the prosecution history where the applicant explained that the information objects (the papers, books, World Wide Web pages, etc. searched by the distributed database) are "broken up into collections of small overlapping fragments" and that queries are fragmented "in the same way." Ex. C, First Office Action Response, at 10-11. Accordingly, Plaintiffs' proposed construction accurately reflects the plain and ordinary meaning of the term "query fragment."

The parties' positions, however, diverge with respect to Defendant's improper attempt to inject two convoluted and unnecessary limitations into this otherwise simple, straightforward claim language. Specifically, Defendant asks the Court to construe the term "query fragment" to additionally require that such fragments (i) "consist[] of a limited number of attributes and attribute values joined by relationships," and (ii) be "specified in the same formal, artificial language and ontology which describes the attribute values of objects of the database." In

addition to lacking support in the intrinsic record as explained below, these additional limitations are needlessly confusing and should be rejected because they are entirely unhelpful and unnecessary to guiding the jury's resolution of the disputed infringement issues. *See Tessera, Inc. v. Micron Tech., Inc*., 423 F.Supp. 2d 624, 631 (E.D. Tex. 2006); *see also Sulzer Textil A.G. v. Picanol N.V.*, 358 F.3d 1356, 1366 (Fed. Cir. 2004) (stating that claim construction is meant to provide guidance as to the proper scope of the claims, allowing the jury to "intelligently determine the question presented").

The first proposed limitation Defendant seeks to import into the claim is stitched together from a statement in the "background of the invention" section of the patent specification. *See* '593 patent, col. 1, ll. 25-31. Importantly, this statement does not appear in the portions of the specification describing the "summary of the invention," drawings, or even the preferred embodiments, *i.e.*, the "detailed description of the invention" section. It is, therefore, not a basis for importing additional limitations into the claim language. *See, e.g., Ventana Medical Sys., Inc. v. Biogenex Labs., Inc.*, 473 F.3d 1173, 1181 (Fed. Cir. 2006) (holding that statements in the "background" section of the patent were not a basis to import limitations not found in the claim).

Moreover, this background statement from the specification is entirely consistent with Plaintiffs' proposed construction, which does not require a particular number of attributes or attribute values in the claimed "query fragments." The background makes clear that a query fragment may consist of multiple attributes and attribute values with joining relationships as well as those embodiments where there is just a single attribute in the query fragment. *See* '593 patent, col. 1, ll. 25-31. In both embodiments, the query fragment consists of a "limited number" of attributes and attribute values. *Id.* To the extent Defendant contends otherwise, its proposed

construction is contrary to the specification, misleading to the jury, and should be rejected. *See Tessera,* 423 F.Supp. 2d at 631.

The second limitation Defendant seeks to import, *i.e.*, that the query fragment must be "specified in the same formal, artificial language and ontology which describes the attribute values of objects of the database," is wholly unsupported by the intrinsic record. First, there is nothing in the claims or the specification that requires the "query fragment" to be "specified in the same formal, artificial language and ontology which describes the attribute values of objects of the database" as Defendant urges. While the specification refers to *content labels* written in a "formal, artificial language specified by the ontology of the database," it nowhere states that *query fragments* must be written in that language. *See* '593 patent, col. 1, ll. 13-14. Indeed, the specification repeatedly refers to the content labels and query fragments as two separate and distinct things. *See, e.g.*, *id.* at col. 1, ll. 25-31. Thus, the portion of the specification referring to "content labels" does not limit the term "query fragment." Likewise, while a portion of the prosecution history refers to using query language that is the "same language" as that used to index objects in the database,[9] there are no statements in the prosecution history requiring that the "query fragment" be in the same language. Thus, there is no disavowal in the prosecution history, much less the "clear and unmistakable" one required to limit the otherwise broader plain meaning of the term "query fragment."[10] *See, e.g., SanDisk Corp.* 415 F.3d at 1287; *Omega Eng'g,* 334 F.3d at 1325-26 (both holding that absent a "clear and unmistakable" disclaimer the prosecution history does not limit the otherwise broader plain meaning of the claim language).

[9] Ex. C, First Office Action Response at 10.

[10] Likewise, there is no support whatsoever for the various additional qualifiers, *i.e.*, "formal" and "artificial," Google seeks to import into the claim. These terms do not appear in the claims, nor is there a clear and unmistakable disavowal in either the prosecution history or specification that requires them. As such, the Court should reject Defendant's improper attempt to import them into the claims. *See id.*; *see also Motorola, Inc. v. VTech Comm'n, Inc.*, Case No. 5:07 CV 171, *5 (E.D. Tex, July 6, 2009) (citing *Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985, 989 (Fed. Cir. 1999)).

Accordingly, the Court should adopt Northeastern's construction and reject Defendant's attempt to import these confusing and unsupported limitations into the claims.

4. "hashing," claims 1 and 13; "hashes," claims 8

Northeastern's Proposed Construction	**Defendant's Proposed Construction**
a computer technique whereby one or more functions are used to transform values into corresponding values	performing a mathematical function on a ***key value*** to ***generate the address of the location of data*** associated with the ***key value***

The parties agree that "hashing" or "hashes" is a computer technique that refers to the use of a function to transform one value into another associated or corresponding value. Northeastern, however, disagrees with Defendant's attempt to limit these terms to a particular type of "hashing" function that requires the transformation of a "key value." The added limitation does not help explain the proper scope of the claim.[11] The intrinsic record does not refer to key values. Moreover, the extrinsic evidence both parties rely upon expressly states that the value being hashed can be or is "usually" a "key value." There is nothing in either the intrinsic or extrinsic evidence that requires the value to be a "key value" in all cases or, more importantly, in this case.

"Hashing" or "hashes" is a well-known computer programming term. Northeastern and Defendant provided several technical dictionary definitions to support their constructions. Northeastern's proposed construction is drawn from the plain and ordinary meaning of the term as evidenced by the dictionary definitions offered by both parties. For example:

- "Hashing . . . is a word coined by computer programmers to describe a general class of operations done to transform one or more fields (*usually a key*) into a different (usually more compact) arrangement." Encyclopedia of Computer Science and Engineering 681 (Anthony Ralston & Edwin D. Reilly, Jr. eds., 1983) (emphasis added) (attached as Ex. E).

[11] It is unclear what Defendant means by the words "key value" and, to date, Defendant's counsel has been unable to explain the distinction to Plaintiffs' counsel.

- "Hashing . . . [a] technique for converting values within fields into more 'compact' representations of the same values. *Usually, values being converted are keys*." Robert A. Edmunds, The Prentice-Hall Standard Glossary of Computer Terminology 191-192 (1985) (emphasis added) (attached as Ex. F).

As can be seen from these definitions, the term "hashing" refers to converting or transforming values. These transformed values are "usually"–but not always–"key values." This is consistent with the claims and specification of the '593 patent, which repeatedly refer to "hashing," but nowhere mention that the hashed value must necessarily be a "key value" as Defendant urges.

Indeed, the claims specify exactly what is required by the terms "hashing" and "hashes." The claims recite that the query fragments are hashed to produce hashed query fragments. The claims further specify how those hashed query fragments are used, *i.e.*, a portion of each hashed query fragment is used to indicate which query node will process the fragment and another portion is used to access data at that query node. *See, e.g.,* '593 patent, claim 1, at col. 10, ll. 38-46. This is consistent with the same teaching in the specification. *Id.* at col. 2, ll. 5-11. To the extent Defendant's proposed construction includes an additional limitation requiring that the hashing terms "generate an address of the location of data," that limitation is both: (i) unnecessary to the extent that other language in the claim already explains the extent to which the hashed query fragments serve an addressing function, and (ii) improper to the extent that Defendant's construction conflicts with the clear teaching of the claim. As such, Defendant's construction should be rejected.

5. "local hash table," claims 1, 8, 13

Northeastern's Proposed Construction	**Defendant's Proposed Construction**
a table that associates hash values with other data	a table resident on ***and unique to*** a particular query node in which ***the unique*** location of the information in the table is determined by hashing a key value

The parties agree that a hash table is a table that associates hash values with other data. This definition comports with the understanding that one of skill in the art would have of the term. *See, e.g.* IBM Dictionary of Computing 309 (George McDaniel ed., 10th ed. 1994) (defining a hash table as a "table of information that is accessed by way of a shortened search key (the hash value)") (attached as Ex. G). Further, that plain and ordinary meaning is confirmed by the claims and specification.

First, the language of the claims recites that the query node uses the second portion of the hashed query fragment "to access data according to a local hash table." *See, e.g.* '593 patent, claim 1, col. 10, ll. 43-46. In addition, the specification also supports this meaning:

> In one embodiment, the hash value resulting from the use of the hashing function has a first portion . . . and a second portion which is the local index by which the data is stored at that node. In one embodiment, the hashing function reduces a query fragment to a 37 bit value . . . and the low order 32 bits . . . provides the index into the local hash table of the node's database.

Id. at col. 3, ll. 37-46; *see also id.*, at col. 7, ll. 50-56.

However, Defendant's construction is erroneous because it additionally requires that the local hash table be "unique to a particular query node" and that there be a "unique location" for the information in that table. These additional "uniqueness" limitations are completely unsupported. They are not found in the claims, nor are they supported by the specification or prosecution history. Defendant is ostensibly attempting to import these limitations to exploit the redundancy in its accused systems in an attempt to avoid liability for its infringement. Defendant has multiple data centers, and in each of those data centers, there are multiple computers that perform the same function (and therefore store the same local hash table). These redundant or "parallelized" computers assist Defendant in accommodating high volumes of search traffic and provide a back up in the event of hardware failures. But they do not distinguish Defendant's infringing systems from the claimed invention. Indeed, all of the asserted claims are

"comprising" claims. This means that the presence of additional steps, components or processes in the accused systems is not a basis for distinguishing the claims. *See, e.g., Gillette Co. v. Energizer Holdings Inc.*, 405 F.3d 1367, 1371-73 (Fed. Cir. 2005) (holding that a claim to a safety razor with a first, second and third blade encompassed razors with more than three blades because the transitional phrase "comprising" in the claim preamble is presumptively open-ended). Defendant's attempt to import its "uniqueness" limitations into the claim language is an improper attempt to circumvent presumptive open-endedness of the asserted claims.

6. "predetermined degree of relevance," claims 3 and 9

Northeastern's Proposed Construction	**Defendant's Proposed Construction**
a degree of relevance that is determined before returning accessed data to the user	a predefined degree of similarity; ***only results meeting or exceeding a predetermined level are returned to the user after the object identifier has been returned***

This claim term appears in dependant claims 3 and 9 and requires that the search results returned to the user have a "predetermined degree of relevance." The "detailed description of the invention" portion of the specification discloses two preferred embodiments for practicing this limitation. In the first of those two embodiments, the "predetermined degree of relevance" is defined by a predetermined number of objects, *e.g.*, the top 20, that have the highest similarity to the user's query: "[i]n one embodiment the N objects with the highest similarity are returned." '593 patent, col. 4, ll. 2-4. In the second preferred embodiment, all of the objects which generate similarity values "greater than a predetermined value are considered sufficiently similar to the query **60** to be returned to the user **10** as relevant information." *Id.* at col. 4, ll. 4-7. Both of these embodiments are encompassed by this claim term, because in both instances the "degree of relevance," *i.e.*, either a predetermined number of objects with the highest similarity values or all objects that exceed a predetermined similarity value, is determined before the results are returned

to the user. Accordingly, Northeastern's proposed construction properly encompasses both of these preferred embodiments.

In contrast, Defendant's proposed construction would erroneously exclude the first of these two preferred embodiments by importing the language emphasized in the comparison of the parties' constructions above. There is no justification for Defendant's attempt to exclude this preferred embodiment from the claims. Indeed, as the Federal Circuit has often explained, a construction that excludes the preferred embodiment is "rarely, if ever, correct." *Vitronics,* 90 F.3d at 1583 (Fed. Cir. 1996); *see also Oatley,* 515 F.3d at 1276 ("We normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification."). Because Northeastern's construction is consistent with both preferred embodiments and the claim language itself, it should be adopted.

B. Terms Proposed by Defendant

On top of the six terms above, Defendant asks the Court to construe five additional phrases, even though each of these phrases is clear on its face and requires no further construction from the Court. As before, Defendant attempts to shoehorn additional limitations into these terms without any legal basis and, at least in some cases, proposes constructions which would actually exclude the preferred embodiments in the specification from the scope of the claims. The Court should reject Defendant's attempt to import erroneous limitations into the claims and rule instead that, for each of these terms and phrases, the plain language alone establishes the proper scope of the claims. *See O2 Micro*, 521 F.3d at 1362.

1. "a plurality of home nodes and a plurality of query nodes connected by a network," claim 1;

"a plurality of home nodes; and a plurality of query nodes; said plurality of home nodes and said plurality of query nodes connected by a network," claims 8 and 13

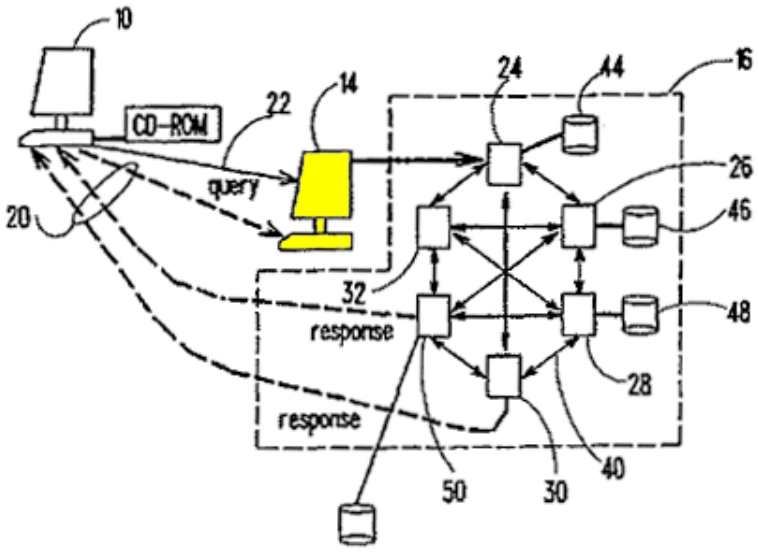
Northeastern's Proposed Construction	Defendant's Proposed Construction
The claim language has its plain and ordinary meaning; no further construction necessary.	a plurality of home nodes and query nodes connected by a network ***arranged with no central server*** and ***wherein, for any given query, any node may be defined as a home node or a query node***

The parties agree that this claim term requires a plurality of home and query nodes connected by a network. Indeed, that is exactly what the claim language, "a plurality of home nodes and a plurality of query nodes connected by a network," says on its face. Defendant does not dispute this and, in fact, adopts almost verbatim the claim language into the first part of its proposed construction.

But Defendant errs by importing two additional unclaimed limitations into this term: (i) the home nodes and query nodes must be "arranged with no central server," and (ii) "wherein, for any given query, any node may be defined as a home node or a query node." Neither of those limitations is consistent with the plain and ordinary meaning of the claim language. Thus, in order to import these additional requirements into the claim, Defendant must show some affirmative redefinition of these terms in the specification or a "clear and unmistakable" disclaimer of an invention lacking those elements elsewhere in the intrinsic record. *See Omega Eng'g,* 334 F.3d at 1325-26. Because nothing like that exists in the intrinsic record of the '593 patent, Defendant's attempt to rewrite the claims should be rejected.

First, Defendant's argument that the term "a plurality of home nodes and a plurality of query nodes connected by a network" means that any node can be defined as a home node or a query node should be rejected as contrary to the overall context of the claims. *See Phillips,* 415 F.3d at 1314 (explaining that "[t]he claims themselves provide substantial guidance as to the meaning of particular claim terms" and therefore the surrounding context of the claim often evidences the proper construction of a particular term). Each of the asserted independent claims

requires a plurality of home nodes *and* a plurality query nodes. The claims go on to explain the functions performed by the home nodes and the different functions performed by the query nodes. If, for any given query, any node could act as a home node or a query node, the different functional requirements specifically called for by the claims would be vitiated. Had the patentee wanted to claim such an arrangement, it could have easily done so by using the same term to refer to both the query and the home nodes. Instead, the entire structure of the claims is based on a clear dichotomy between a "home node" and a "query node." Indeed, during prosecution the applicant distinguished the claimed invention from the prior art based on this difference. *See* Ex. C, Amendment and Remarks, dated May 14, 1997 at 2 ("Kuechler makes no distinction between a home node and a query node as recited in each of the independent claims of the present invention."). Defendant's attempt to read a limitation into the claims to vitiate this distinction must be rejected.



Defendant also erroneously seeks to import a limitation requiring that there be "no central server" in the claimed invention. That construction is directly contrary to the preferred embodiment of the invention shown in Fig. 1 of the '593 patent. That embodiment, reproduced

above, includes a "front-end computer 14" (highlighting added) that acts as a central server by receiving a query from a user's computer 10, issuing an acknowledgement that the query has been received, and then transmitting the query to the search engine's home node 24. '593 patent col. 3, ll. 17-24.

While the asserted claims do not require a central front-end server as shown in Fig. 1 of the patent, it is well-settled in claim construction law that there is a very strong presumption against importing a limitation which would exclude the central server disclosed in this preferred embodiment of the invention. *See, e.g., Vitronics*, 90 F.3d at 1583 (explaining that a construction which excludes the preferred embodiment is "rarely, if ever, correct").

Defendant's basis for its attempt to construe the preferred embodiment out of the claims presumably includes certain statements made during prosecution of the patent. But a careful review of the prosecution history reveals that applicant did not, as Defendant contends, clearly and unmistakably disclaim the preferred embodiment shown above Figure 2. *See, e.g., SanDisk Corp.*, 415 F.3d at 1287; *Omega Eng'g*, 334 F.3d at 1325-26 (both holding that absent a "clear and unmistakable" disclaimer the prosecution history does not limit the otherwise broader plain meaning of the claim language). In distinguishing over a particular prior art reference, the applicant stated, "there is no central server in the present invention." Ex. C, First Office Action Response, at 13. But the term "central server" in this context actually comes from the reference itself, which discloses a scheme of identifying and allocating "Time Sensitive Attributes" and "Time Invariant Attributes" of relations in a relational database system. Alok R. Chaturvedi *et al., Scheduling the Allocation of Data Fragments in a Distributed Database Environment: A Machine Learning Approach*, 41 IEEE Transactions on Eng'g Mgmt. 194, 195 (1994) (attached as Ex. H). In the Chaturvedi relational database system, the referenced "central server" is a

special type of server that stores the "Time Sensitive Attributes" of relations, while the other servers in the system only store the "Time Invariant Attributes" of those relations. *Id.* at 196. Consequently, the "central server" distinguished by the patentee has no special significance outside of the Chaturvedi reference, and even less so in the claimed non-relational database system. As such, this statement does not amount to a clear and unmistakable disavowal of embodiments of the claimed invention where one or more of the computer nodes could be described as a central server. *See, e.g.*, *SanDisk Corp.*, 415 F.3d at 1287; *Omega Eng'g*, 334 F.3d at 1325-26.

2. "a first portion and a second portion," claims 1, 8, and 13

Northeastern's Proposed Construction	**Defendant's Proposed Construction**
The claim language has its plain and ordinary meaning; no further construction is necessary.	a first part ***separate and distinct from*** a second part

This claim limitation refers to the hashed query fragment and requires that the hashed query fragment have "a first portion and a second portion," that, as described later in the claims, are used to identify the query node and access data at the query node. This claim language is clear on its face. But Defendant erroneously attempts to infer a requirement that the first and second portion be entirely "separate and distinct" from each other. In other words, Defendant wants to construe the term such that, if any part of the two portions of the hashed query fragment overlap, *e.g.*, if some of the bits in the first portion are also part of the second portion, then there is no infringement. Nothing in the claim language requires such, nor is this "separate and distinct" requirement compelled by any other statement in the intrinsic record. Consequently, Defendant's attempt to import the limitation into the claims should be rejected.

It is well-settled that, absent a clear indication to the contrary in the intrinsic record, the mere fact a claim recites two structures is not a basis for importing a limitation that those two

structures be "separate and distinct." For example, in the recent Federal Circuit *Linear Tech* decision, the claims-at-issue required a "second circuit" and a "third circuit" that each performed a particular stated function. *Linear Tech. Corp. v. ITC*, 566 F.3d 1049, 1055 (Fed. Cir. 2009). The Court rejected the argument that the "second circuit" and the "third circuit" had to be composed entirely of separate and distinct components, because "there [wa]s nothing in the claim language or specification that support[ed] narrowly construing the terms to require a specific structural requirement or entirely distinct 'second' and 'third' circuits." *Id.* Instead, the Court explained that "absent a clear disavowal or contrary definition in the specification or the prosecution history," the terms "second circuit" and "third circuit" must be construed to encompass embodiments where the circuits overlap and share common parts. *Id.*

Like the *Linear Tech* case, there is nothing in the intrinsic record of the '593 patent that compels the "separate and distinct" limitation that Defendant wants to read into the claim. Indeed, there is no suggestion anywhere that there cannot be overlap between these two portions, much less the "clear disavowal or contrary definition" required to limit the broader plain and ordinary meaning of the claim language. Consequently, the Court should reject Defendant's proposed construction and hold that the claim language means exactly what it says, *i.e.*, that there is "a first portion and a second portion" in the hashed query fragment.

3. "transmitting, by said selected home node, each said hashed query fragment of said plurality of query fragments to a respective one of said plurality of query nodes indicated by said first portion of each said hashed query fragment," claim 1;

"transmits each said hashed query fragment to a respective one of said plurality of query nodes indicated by said first portion of said hashed query fragment," claim 8;

"transmitting a query message containing every said hashed query fragment to a respective one of said plurality of query nodes indicated by said first portion of said hashed query fragment," claim 13

Northeastern's Proposed Construction	**Defendant's Proposed Construction**
The claim language has its plain and ordinary meaning; no further construction is necessary.	the selected home node sends each hashed query fragment ***to exactly one*** node on the network, that node being identified by said first portion of the hashed query fragment

Northeastern submits that this claim language, like much of the other language Defendant seeks to construe, is already clear on its face and has its plain and ordinary meaning. As the claim states, the home node transmits each hashed query fragment to a respective query node as indicated by the first portion of the hashed query fragment. Defendant does not seem to disagree with that and, in fact, most of its proposed construction simply parrots the otherwise clear claim language. But Defendant goes further, in an improper attempt to improperly narrow the claims to embodiments in which the hashed query fragment is sent to "exactly one" node.

The claims require only that the hashed query fragment be transmitted to "a respective one of said plurality of query nodes" indicated by the first portion of the hashed query fragment. Nothing in that language limits how the hashed query fragment is transmitted to that "respective one" query node or otherwise prevents it from passing through other nodes en route to its intended destination. By way of analogy, if a letter sent to a particular address in Austin is mailed from a post office in Marshall, that letter is transmitted to that "respective one" address, regardless of whether the letter might first pass through other intermediate locations, *e.g.*, a post office in Dallas, on its way to Austin. Defendant's construction, limiting transmission from the home node to *exactly one* node, improperly narrows this plain and ordinary meaning of the claim language by excluding any situation in which the hashed query fragment might pass through other intermediate nodes en route to the intended query node.

Moreover, such a construction is contrary to the claim language because it ignores the fact that the asserted claims are each written in open-ended "comprising" form. Because these

are open-ended claims, the fact that a hashed query fragment may be transmitted to other locations *in addition to* the claimed "respective one" query node does not distinguish the claims. *See, e.g.*, *Gillette*, 405 F.3d at 1371-73. Accordingly, Google's attempt to import an "exactly one" limitation into the otherwise clear claim language should be rejected.

4. "using, by said query node, said second portion of said respective hashed query fragment to access data according to a local hash table located on said query node," claim 1;

"each said query node uses said second portion of said hashed query fragment to access data according to a local hash table located on said query node," claim 8;

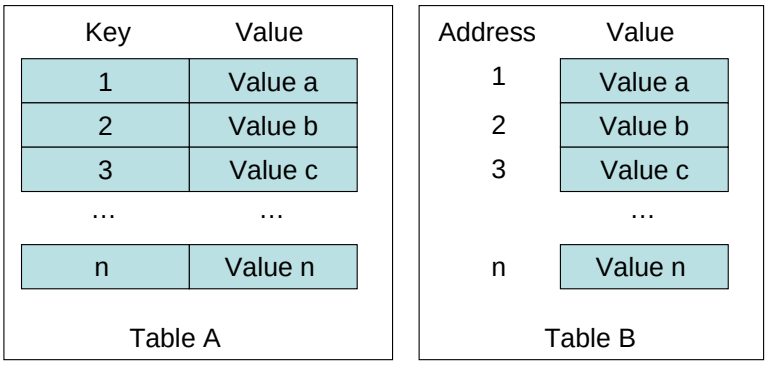
"said query node, upon receipt of said query message, using said second portion of said hashed query fragment to access data according to a local hash table located on said query node," claim 13

Northeastern's Proposed Construction	**Defendant's Proposed Construction**
The claim language has its plain and ordinary meaning; no further construction is necessary.	each query node receiving a hashed query fragment uses the second portion of the hashed query fragment as a ***key value*** to identify the address of data according to a local hash table stored on that query node

The claims of the '593 patent clearly set out that each query fragment is hashed to produce a hashed query fragment, and a portion of this hashed query fragment is then used to access data in a local hash table. Defendant's proposal impermissibly limits the way in which the second portion of the hashed query fragment is used to a specific method that is unsupported by the claim language or the intrinsic record.

As discussed above, the parties agree a hash table associates hash values with other data or information. However, in its construction for this phrase, Defendant asks the Court to require that the query node use the hashed value fragment as a "key value" in a table, and not in any other way, to access data in the local hash table. A side-by-side comparison of two approaches, one that uses that hashed query fragment as a key value, and one that uses that hashed query

fragment as an address, sheds light on the limitation Defendant seeks to import into the claim.



Key	Value
1	Value a
2	Value b
3	Value c
…	…
n	Value n

Table A

Address	Value
1	Value a
2	Value b
3	Value c
	…
n	Value n

Table B

Table A depicted on the left has two columns—the first column containing keys, which are used to look up values stored in the second column. Under Defendant's construction, if a hashed query fragment in a given example were the number 2, the system would look up the row that had the number 2 stored as a key in the table, and then find the value, "Value b" associated with the key. Typically, rather than search through all the keys to find the one numbered "2" a system using a structure like Table A would first hash the key value to find the appropriate entry, and then perform the look-up, which would mean that the previously hashed query fragment would need to be hashed twice under Defendant's proposed construction.

However, this is not the only way that a system can use the hashed query fragment to locate a value in a local hash table. In particular, if the hashed query fragment specifies an address or location in the table, as shown Table B to the right, one would simply select the row in the table whose address was 2, look up the value associated with that address, which is again "Value b," and return the value.

Defendant improperly seeks to narrow the claims to cover only "using" the hashed query fragment in the manner of Table A, and to exclude "using" the hashed query fragment in the manner of hash Table B. Not only is this interpretation unsupported by the intrinsic record, but also, Defendant's "key value" limitation would exclude the preferred embodiment described in the specification. In describing a preferred embodiment of the invention, the specification states, "the hash value resulting from the use of the hashing function . . . has a second portion which is

the local index by which the data is stored at [the] node." '593 patent, at col. 3, ll.37-42. This passage continues with a second embodiment:

> [T]he hashing function reduces a query fragment to 37 bit value, in which the first 5 bits designate the node to which the data or query is sent and the low order 32 bits which provides the index into the local hash table of the node's database.

Id. at col. 3, ll. 42-46. In these embodiments, the second portion of the hashed query fragment—a hash value—is used to access the local hash table without first hashing it again. In other words, the preferred embodiment employs the method of Table B. Defendant's proposed construction would exclude this embodiment. As such, Defendant's construction is erroneous and this claim passage needs no further construction from the Court.

5. "returning, by each said query node," claim 1;

"each said query node . . . returns," claim 8;

"said query node . . . returning," claim 13

Northeastern's Proposed Construction	**Defendant's Proposed Construction**
The claim language has its plain and ordinary meaning; no further construction is necessary.	each query node that accesses data returns an object identifier to the home node

This claim language refers to what is returned from the claimed query nodes. In the context of the surrounding claim language of claim 1, for example, the claims recite as follows: "*returning, by each said query node* accessing data according to said respective hashed query fragment, an object identifier corresponding to said accessed data to said selected home node." '593 patent col. 10, ll. 48-51. Northeastern submits that this claim language is already clear on its face and no further construction is necessary. Defendant's proposed construction for this claim term is largely redundant of the surrounding claim language and is, therefore, unnecessarily confusing. Thus, the Court should reject Defendant's proposed construction and hold that the claim language means precisely what is recited in the claim itself. *Motorola*, 2009

WL 2026317, at *8 (“[W]here additional language may be unduly limiting, confusing, or redundant, it is in a court’s power to determine that no construction is necessary.”)

IV. CONCLUSION

For the reasons set forth above, Plaintiffs respectfully request that each of their proposed constructions of disputed claim terms be adopted by the Court.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing document was filed electronically in compliance with Local Rule CV-5(a). As such, this document was served on all counsel who are deemed to have consented to electronic service. Local Rule CV-5(a)(3)(A). Pursuant to Fed. R. Civ. P. 5(d) and Local Rule CV-5(d) and (e), all other counsel of record not deemed to have consented to electronic service were served with a true and correct copy of the foregoing by email and/or fax, on this the 13th day of November, 2009.

/s/ Stephen C. Stout
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