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Paper No. 40
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

INTERNATIONAL BUSINESS MACHINES CORP.,
Petitioner,

v.

INTELLECTUAL VENTURES I LLC,
Patent Owner.

IPR2015-01481
Patent 6,510,434 B1

Before MEREDITH C. PETRAVICK, JENNIFER S. BISK, and SHEILA F. McSHANE, *Administrative Patent Judges.*

PETRAVICK, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
*35 U.S.C. § 318(a) and 37 C.F.R. § 42.73*

# I. INTRODUCTION

International Business Machine Corp. ("Petitioner") filed a Petition requesting *inter partes* review of claims 1–3, 5–8, 12, 14, and 16 of U.S. Patent No. 6,510,434 B1 (Ex. 1004, "the '434 patent"). Paper 2 ("Pet."). Petitioner proffered a Declaration of H. V. Jagadish to support its analysis regarding patentability in the Petition. Ex. 1001.

We instituted *inter partes* review of claim 1–3, 5, and 6 as being obvious over Wical[1] and Lassila[2] and as being obvious over Morita[3] and Lassila. Paper 12, 25. We denied institution of *inter partes* review of claims 7, 8, 12, 14, and 16 as being anticipated by Wical and as being anticipated by Morita. *Id.* at 8–17.

Intellectual Ventures I LLC ("Patent Owner") filed a Patent Owner's Response to the Petition. Paper 17 ("PO Resp."). Patent Owner proffered a Declaration of Dr. Yannis Papakonstantinou to support its argument in the Patent Owner's Response. Ex. 2001.

Petitioner filed a Corrected Reply to the Patent Owner's Response (Paper 24) and proffered a Responsive Declaration of H. V. Jagadish for support (Ex. 1022).[4]

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[1] U.S. Patent No. 6,038,560 (issued Mar. 14, 2000) (Ex. 1006).
[2] Ora Lassila, *Web Metadata: A Matter of Semantics*, IEEE Internet Computing, Vol. 2, Number 4 (allegedly published July/Aug. 1998) (Ex. 1008).
[3] U. S. Patent No. 5,168,565 (issued Dec. 1, 1992) (Ex. 1007).
[4] On August 16, 2016, Patent Owner objected to the Corrected Reply to the Patent Owner's Response and the Responsive Declaration of H.W. Jagadish as containing new argument not raised in the Petition. *See* Paper 36. After reviewing the record, we determine that the Reply and Responsive Declaration did not contain new arguments. *Id.* Patent Owner raised the objection again during oral argument. *See* Tr. 21–22. In any event, Patent

Patent Owner filed a Motion for Observations on Cross-Examination of Dr. H.V. Jagadish (Paper 29) and Petitioner filed an opposition to the motion (Paper 35).

An oral hearing in this proceeding was held on September 14, 2016. A transcript of the hearing is included in the record (Paper 39, "Tr.").

We have jurisdiction under 35 U.S.C. § 6  This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–3, 5, and 6 of the '434 patent are unpatentable.

### *A. Related Proceedings*

The parties indicate that the '434 patent is at issue in *Intellectual Ventures I LLC et al. v. Erie Indemnity Co., et al.,* Case No. 1:14-cv-000220, *Intellectual Ventures I LLC et al. v. Old Republic Gen. Ins. Grp., Inc., et al.,* Case No 2:14-cv-01130, and *Intellectual Ventures I LLC et al. v. Highmark, Inc. et al.,* Case No. 2:14-cv-01131, all in the U.S. District Court for the Western District of Pennsylvania.  Pet. 1; Paper 5, 2.

Patent Owner indicated that, on September 25, 2015, in each of the above proceedings, the District Court in the Western District of Pennsylvania dismissed the claims for infringement of the '434 patent because the court found the asserted claims patent ineligible under 35 U.S.C. § 101.  Paper 8, 2; Exs. 2010, 2011.  Patent Owner appealed the dismissal to

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Owner's objection is now moot as we do not rely upon the Corrected Reply to the Patent Owner's Response and the Responsive Declaration of H.W. Jagadish in our analysis below.

the Court of Appeals for the Federal Circuit. *Intellectual Ventures I LLC et al. v. Erie Indemnity Co., et al.*, Case No. 12-1128 (Fed. Cir. filed Oct. 27, 2015). The Court of Appeals for the Federal Circuit has not yet issued a decision.

The ’434 patent is the subject of two additional *inter partes* reviews, *Old Republic Gen. Ins. Grp., Inc. v. Intellectual Ventures I LLC*, Case IPR2016-00019 (PTAB filed Oct. 6, 2015) and *Old Republic Gen. Ins. Grp., Inc. v. Intellectual Ventures I LLC*, Case IPR2016-00020 (PTAB filed Oct. 6, 2015) (together, “the Old Republic IPRs”). The Board has not yet issued a final written decision in either *inter partes* review.

### *B. The ’434 Patent*

The ’434 patent is titled “System and Method for Retrieving Information From a Database Using an Index of XML Tags and Metafiles” and issued on January 21, 2003, from an application filed on December 29, 1999. Ex. 1004, (22), (45), (54). One embodiment of the ’434 patent discloses a method of “[r]etrieving information from a database using [eXtensible Markup Language (“XML”)] tags and metafiles.” *Id*. at Abstract. The method of retrieving information uses “an index that includes tags and metafiles to locate the desired information.” *Id.* at 4:11–13; *see also id.* at 7:19–20 (“The index includes a number of tags and metafiles associated with the tags.”)

The ’434 patent also discloses an embodiment of a method of creating a database and an index for searching the database. All the challenged claims, 1–3, 5, and 6, are directed to the method of creating the database and index.

Figure 5 of the ’434 patent is reproduced below.

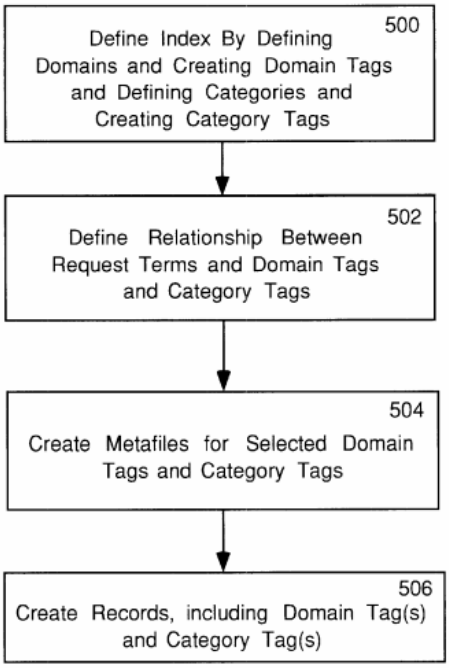



**FIG. 5**

Figure 5 “illustrates the steps for creating an index, including XML tags and metafiles, that can be used to search a database.” *Id.* at 11:5–8. In step 500, the index is defined by defining the XML tags for the index. *Id.* at 5:8–9. The XML tags include domain tags and category tags. For example, a domain may be “Restaurants” and a category may be “Cuisine,” which includes the terms “Mexican” and “American.” *Id.* at 4:18–33.

In step 504, “metafiles are created for selected domain tags and category tags that were defined in step 500.” *Id.* at 11:45–46. The metafile can be created manually by using data gathered from observing the types of information that a user typically considers. *Id.* at 11:50–52. The metafile

provides additional information about the tag and includes related tags and the relationship between related tags. *Id*. at 9:18–58. Figure 3B of the ’434 patent is reproduced below.

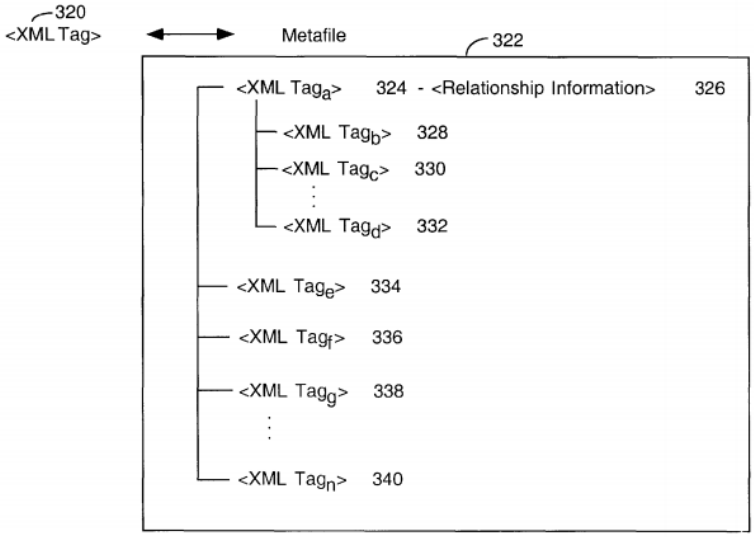



**FIG. 3B**

Figure 3B depicts metafile 322 for XML Tag 320. *Id.* at 9:34–35. Metafile 322 includes relationship information 326 and related XML Tags 328, 330, 332, 334, 336, 338, and 340, arranged in a hierarchy. *Id.* at 9:35–41. For example, XML Tag 320 may be a Restaurant domain tag and related XML Tag 328 may be an American Cuisine category tag. *Id*. at 9:48–54. The hierarchy of the tags in the metafile can be used to prioritize search criteria. *Id*. at 9:54–58; *see also* Fig. 3B (depicting related tags in a hierarchy).

In step 506, “the individual records for the database are created.” Each record in the database contains an alpha component and an index component. *Id.* at 10:9–14. The alpha component contains identifying information for the record, and the index component contains XML domain tags and XML category tags. *Id*. Figure 4B of the ’434 patent is reproduced below.

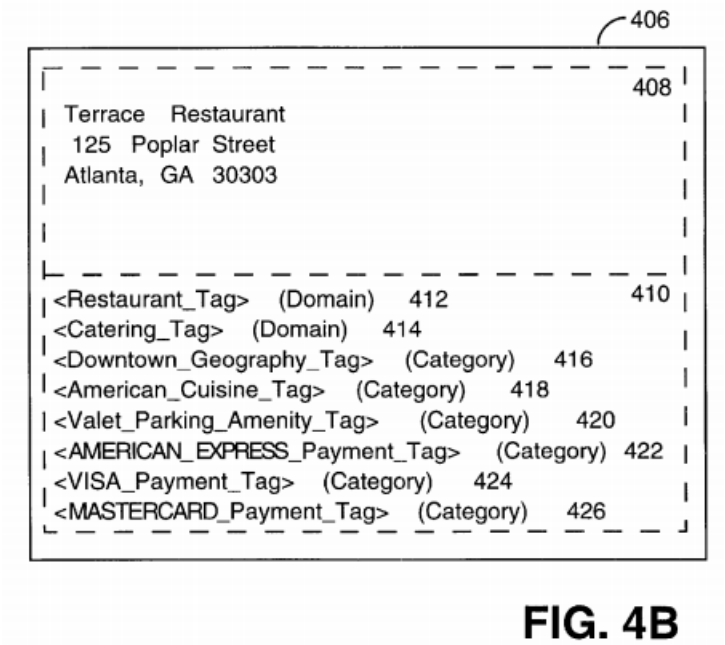



FIG. 4B

Figure 4B depicts an example of a database record. *Id*. at 10:9–16. In the example depicted in Figure 4B, alpha component 408 contains the name and address of the Terrace Restaurant and index component 410 includes, among others, Restaurant domain tag 412 and American Cuisine category tag 418. *Id*. at 10:16–51. Restaurant domain tag 412 identifies the Terrace Restaurant as a restaurant, and American Cuisine category tag 418 indicates that it serves American Cuisine. *Id*. at 10:36–42.

When a search request is received, a set of tags that correspond to the search terms is identified, and metafiles that correspond to the identified tags are also identified. *Id.* at 12:53–58; Fig. 6A, steps 602, 604. From the metafiles, related tags that are appropriate for the request are identified. *Id*. at 13:62–14:11; Fig. 6A, step 608. The tags corresponding to the search terms and the appropriate tags are combined to create a key, and the database is searched to identify records that include the tags of the key. *Id*. at 13:17–24; Fig. 6A, steps 610, 612.

### *C. Illustrative Claim*

Claim 1 is independent and claims 2, 3, 5, and 6 depend, directly or indirectly, from claim 1. Claim 1 is illustrative of the subject matter of ’434 patent at issue and is reproduced below.

> 1. A method for creating a database and an index to search the database, comprising the steps of:
>
> creating the index by defining a plurality of XML tags including domain tags and category tags;
>
> creating a first metafile that corresponds to a first domain tag; and
>
> creating the database by providing a plurality of records, each record having an XML index component.

## II. ANALYSIS

### *A. Claim Construction*

In an *inter partes* review, the Board interprets claim terms in an unexpired patent according to the broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation approach). Under that standard, and absent any special definitions, we generally give claim terms their ordinary and customary meaning, as they would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In absence of such a definition, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Petitioner proposes constructions for a number of claim terms — "tag," "category," "domain," "index," "metafile," and "index component." Pet. 3–6. "Patent Owner asserts that the prior art would not render the claims obvious under any reasonable construction consistent with the specification and thus the Board should decline to provide express constructions for the terms proposed by the Petitioner." PO Resp. 6.

Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed.Cir.1999). To resolve the issues before us we need only address the terms discussed below.

*"creating the index" and "creating a first metafile"*

Claim 1 recites a method that includes a step of "creating the index by defining a plurality of XML tags including domain tags and category tags" and a step of "creating a first metafile that corresponds to a first domain tag." Ex. 1004, claim 1.

Petitioner proposes that "index" be construed to mean "data structure used to locate information in a database" and "metafile" be construed to mean "data structure comprising additional information about a tag, including related tags." Pet. 5–6.

Patent Owner does not propose an explicit construction of the terms "index" and "metafile" but argues that the index and the metafile must be construed to be separate and distinct data structures because the "index" and "metafile" are listed separately in the claim. *See, e.g.*, PO Resp. 9–10 (citing *Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) ("*Becton*")).

Patent Owner's argument is not persuasive. In *Becton*, the claim at issue was directed to a mechanical device — a shieldable needle assembly having a hinged arm element and spring means element. *Becton*, 616 F.3d 1254. The Court determined that the unequivocal language of the claim required a separate hinged arm and spring means and that the specification of the patent at issue confirmed that the hinged arm and spring means were separate elements. *Id.* at 1254–55. The Court stated "[i]n the absence of any evidence to the contrary, we must presume that the use of . . . different terms in the claims connotes different meanings." *Id.* at 1254 (quoting *CAE Screenplates, Inc. v. Heinrich Fiedler GmbH & Co.*, 224 F. 3d 1308, 1317 (Fed. Cir. 2000)).

Unlike the claim at issue in *Becton*, which was directed to a mechanical apparatus, claim 1 of the '434 patent is directed to "a method of creating a database and an index" setting forth steps for creating the database and index. Ex. 1004, claim 1. The first step of the method is "creating the index by defining a plurality of XML tags including domain tags and category tags," the second step is "creating a first metafile that corresponds to a first domain tag," and the third step is "creating the database." *Id.* Claim 1 does not recite any language that defines how and where the first metafile is created (e.g., as part of the index, database, or elsewhere). Claim 1 does not recite any language that precludes the first metafile from being created as part of the index, such that the index would include the domain tags, category tags, and the first metafile.

Also, unlike *Becton*, construing claim 1 such that the index and the first metafile are required to be separate and distinct data structures would be inconsistent with the '434 patent. The '434 patent discloses an embodiment

of a method of creating the index. The method of creating the index includes not only a first step of defining domain and category tags, but also a subsequent step of creating the a metafile. Ex. 1004, 11:6–7 ("creating an index, including XML tags and metafiles"); Fig. 5, steps 500, 504. The '434 patent discloses that the metafile is part of the index. *Id.* at 4:13–14 ("an index that includes tags and metafiles to locate the desired information").

In the Old Republic IPRs, Patent Owner proffers a construction of "index" that is in direct contradiction to its argument here. There, Patent Owner contends that "the broadest reasonable interpretation of 'index' in light of the specification is 'a data structure that includes tags and metafiles to locate the information in a database.'" *Old Republic*, IPR2016-00019, Paper 12, 8; *see also Old Republic*, IPR2016-00020, Paper 12, 9; *see also* Ex. 2001 ¶¶ 31–34. Likewise, the testimony of Patent Owner's declarant Dr. Papakonstantinou in this case is in direct contradiction to his testimony in the Old Republic IPRs. Here, Dr. Papakonstantinou testifies:

> Q. Okay. Does the '434 patent require an index and a metafile to be separate and distinction data structures?
>
> [Dr. Papakonstantinou]. The -- yes. The Claim 1 is talking about an index and a metafile. And they are two distinct structures.
>
> Q. So you're basing your conclusion that they need to be separate and distinct based on the language of Claim 1?
>
> [Dr. Papakonstantinou]. And not only the -- the -- not only the language of Claim 1 but -- definitely the language of Claim 1, but also the whole specification is, pages after pages, very clear on it.

Ex. 2012, 66:4–16.

In the Old Republic IPRs, Dr. Papakonstantinou, however, testifies "one of ordinary skill in the art would understand that the invention in the

'434 patent requires the index [to] include tags and metafiles." *Old Republic*, IPR2016-00019, Ex. 2001 ¶ 34. Dr. Papakonstantinou's testimony in the Old Republic IPRs is in direct contradiction to Patent Owner's argument here. In light of this, we give little weight to Dr. Papakonstantinou's testimony concerning claim construction or any other matter in the record.

Patent Owner also argues that "index" and "metafile" must be construed to have different or distinct structures because otherwise a prior art element may unreasonably read on both the claimed index and metafile. PO Resp. 13–14, 25–27. For example, Patent Owner argues that it is unreasonable to construe index and metafile, such that Wical's knowledge base could read on both claim limitations. *Id.* at 13–14.

As explained above, the plain language of claim 1 does not require the index or the metafile to have different or distinct structures. The language of claim 1 does not require any of the structure of the index other than it includes defined domain and category tags. The language of claim 1 does not require the structure of the index to be distinct or different from the structure of the first metafile. Further, such a requirement would be inconsistent with the specification of the '434 patent. The '434 patent discloses that the metafile is included in the index. Ex. 1004, 4:13–14. The '434 patent describes that the index and metafile perform similar functions and have similar structures. *See, e.g.*, *id.* at 2:38–40 ("[A]n index includes tags and metafiles to locate the desired information. In general, an index is essentially a guide that is used to locate information stored in a database"), 2:61–64 ("A metafile provides additional information about the tag. A metafile typically includes a list of related tags.").

Given the above, we are not persuaded that the broadest reasonable construction in light of the specification of the ’434 patent that the steps of “creating an index” and “creating a first metafile” require the index and metafile be separate and distinct data structures. Any further construction of the term index or metafile is not necessary to resolve the issues before us.

*“creating a hierarchy between the tags”*

Claim 5 depends from claim 3 and recites an additional step of “creating a hierarchy between the tags in the metafile.” Similarly, claim 6 depends from claim 1 and recites “wherein the step of creating a first metafile comprises the steps of: . . . creating a hierarchy between the tags in the first set of XML tags.” The first set of XML tags are related to the first domain tag. *See* Ex. 1004, claim 6.

Neither Petitioner nor Patent Owner provide an explicit construction of “creating a hierarchy between the tags.” *See* Pet. 3–6, PO Resp. 6–7. Patent Owner, however, argues that “creating a hierarchy between the tags” is “not claiming a tree structure where domains are above categories but rather is claiming a priority between the tags in a metafile that are related to the first domain tag.” PO Resp. 19; *see also id.* at 23 (“[c]laim 6 of the ‘434 is not claiming any hierarchy where domains are above categories but rather is claiming a priority hierarchy of the tags related to the first domain tag in a metafile”). According to Patent Owner, the limitation must be construed to be something other than a category-subcategory relation because the specification of the ’434 patent “consistently uses the term ‘hierarchy’ of tags in a metafile to refer only to a priority among tags.” *Id.* at 19 (citing Ex. 1004, 8:1–7, 8:55–57, 9:43–47).

We are not persuaded that the claimed "hierarchy" should be construed to preclude category-subcategory relation and to require a priority between the tags. Nothing in the plain language of claims 5 and 6 requires such, and, contrary to Patent Owner's argument, the specification of the '434 patent explicitly states that other hierarchies can be used — "[a]s will be apparent to those skilled in the art, other tags and hierarchies can be included in the metafile." Ex. 1004, 9:56–58.

We, thus, are not persuaded that the broadest reasonable construction in light of the specification of the '434 patent of "hierarchy" precludes a category-subcategory relation and requires a priority between the tags. Any further construction of the term "hierarchy" is not necessary to resolve the issues before us.

*B. Unpatentability*

> Section 103(a) forbids issuance of a patent when "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."

*KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The ultimate determination of obviousness under § 103 is a question of law based on underlying factual findings. *In re Baxter Int'l, Inc.*, 678 F.3d 1357, 1362 (Fed. Cir. 2012) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1969)). These underlying factual considerations consist of: (1) the "level of ordinary skill in the pertinent art," (2) the "scope and content of the prior art," (3) the "differences between the prior art and the claims at issue," and (4) "secondary considerations" of non-obviousness such as "commercial

success, long-felt but unsolved needs, failure of others, etc."[5] *KSR*, 550 U.S. at 406 (2007) (quoting *Graham*, 338 U.S. at 17–18).

*a. Wical and Lassila*

Petitioner contends that claims 1–3, 5, and 6 are unpatentable over Wical and Lassila. Pet. 28–33. Petitioner supports its contention with a declaration of Dr. Jagadish. Ex. 1001 ¶¶ 107–164.

*1. Wical*

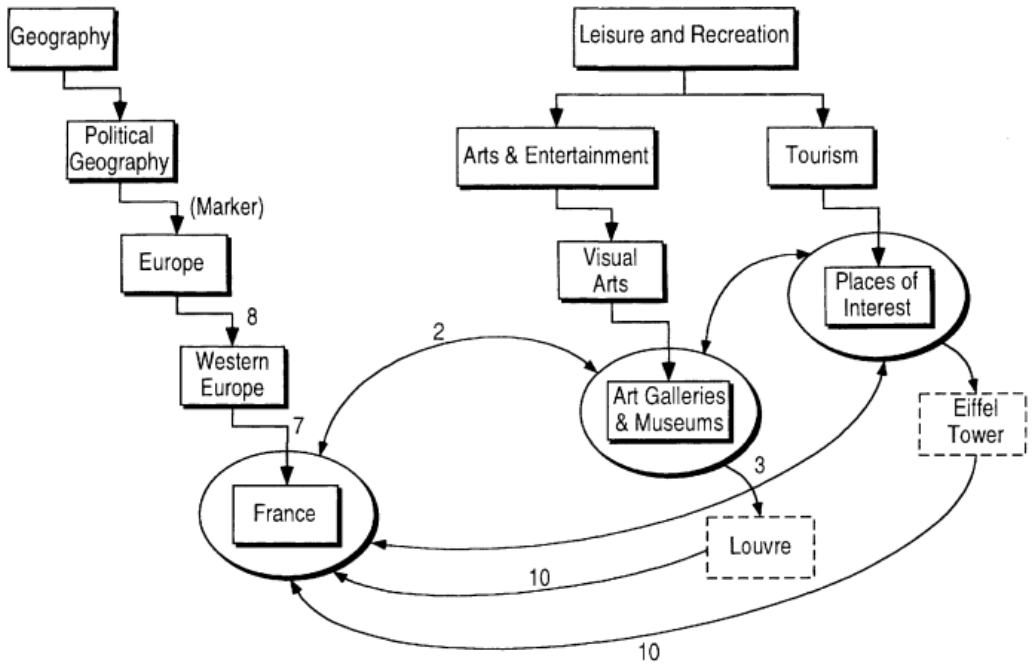
Wical is titled "Concept Knowledge Base Search and Retrieval System." Ex. 1006, [54]. Wical discloses a search and retrieval system that receives a search query from a user and, in one mode of operation, identifies documents relevant to the query. *Id*. at Abstract, 5:29–33. Each document has a document theme vector, which includes a list of document themes, theme strengths, and corresponding categories. *See id*. at 7:41–8:9, Table 1.

A knowledge base 155 contains classification categories or topics, such as the knowledge catalog 150, which identifies categories and sub-categories for the document themes. *Id.* at 5:60–61, 6:7–11, 11:14–35. The knowledge base is "augmented with additional terminology including cross references and links among terminology/categories," (i.e., a directed graph). *Id.* at 6:11–22, 11:15–17, 11:36–12:45.

[5] The record contains no evidence of secondary considerations.

Figure 4 of Wical is reproduced below.

FIG. 4




"Figure 4 illustrates an example portion of the knowledge base that include a directed graph." *Id*. at 3:27–28; *see also* 11:17–20. Figure 4 depicts classification categories and sub-categories, such as "geography" and "France." The categories and sub-categories are arranged hierarchically. *Id*. at 11: 20–35. The direct graph cross references or links the term, for example the term "Eiffel Tower" is linked with the category "France." *Id*. at 11:62–12:7. The cross referencing and links are indicated by the circles, lines, and arrows in Fig. 4. *Id.* at 11:41–43.

The knowledge base and directed graph are used to expand the query terms by mapping the query terms to categories and to identify related categories/terms. *Id*. at 13:45–51; Fig. 5, steps 405, 410. Each category or term of the expanded query terms is used to select documents classified for those categories. *Id*. at 14:56–58; Fig. 5, step 420.

*2. Claim 1*

Petitioner contends that Wical teaches all of the limitations of claim 1, except for the tags being XML tags. Pet. 28–31. In particular, Petitioner contends that

> Wical discloses creating a Knowledge Base containing categories (i.e., tags) arranged hierarchically. The Knowledge Base is an index used to search the database.
>
> . . .
>
> Wical discloses creating a Knowledge Base containing category tags and domain tags. When the Knowledge Base is created, it also contain information about relationships among categories. (Ex. 1006 at 6:7-22, 11:14-45, 11:56-65; Ex. 1001 ¶ 118.) This information is stored using a directed graph structure. (*Id.*) The directed graph for a particular category (i.e., metafile) includes related categories and related information about the categories. (*Id.*)

Pet. 28–29. Petitioner argues that Wical is silent as to the syntax used to create Wical's knowledge base, and that Lassila teaches using XML as a syntax for implementing metadata. *Id*. at 28–29. Petitioner contends that "[i]t would have been a predictable use of prior art elements and known techniques for a [person of ordinary skill in the art] to use XML to implement Wical's teachings." *Id.* at 11–13 (citing Ex. 1001 ¶¶ 28, 163).

Patent Owner does not dispute Petitioner's assertion that it would have been obvious to implement Wical's teachings using XML (*see* Tr. 21:12–14 ("Lassila was used for the same premise in both [instituted grounds] namely that XML tags would have been obvious, and we're not disputing that.")). *See In re: NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) (The Board need only make factual findings as to the limitations that

the Patent Owner challenges.). Patent Owner, however, disputes that Wical teaches the claimed steps of creating the index and creating a first metafile. According to Patent Owner, Wical fails to meet the claimed steps because Wical does not teach that its knowledge base (i.e., index) is a separate and distinct data structure from its directed graph (i.e., metafile). PO Resp. 1–11. Patent Owner asserts that Wical's knowledge base and directed graph are one in the same. *Id.*

Patent Owner's argument is unpersuasive because it is not commensurate with the scope of the claim. As discussed above, the broadest reasonable construction in light of the specification of the '434 patent of the claimed steps does not require that the index and the first metafile be separate and distinct data structures. When given the broadest reasonable interpretation in light of the Specification of the '434 patent, Wical meets the claimed steps of creating an index and creating a first metafile. As the Petition points out (Pet. 28–30), Wical discloses creating a knowledge base, which contains classification categories (i.e., tag) and discloses augmenting the knowledge base with additional terminology, cross references, and links of the directed graph. *See* Ex. 1006, 6:7–22, 11:14–45, 11:56–65.

Patent Owner also disputes that Wical teaches a metafile that corresponds to a first domain tag because, according to Patent Owner, Wical's directed graph corresponds to every category or tag in the index. PO Resp. 12–14. Patent Owner's argument is unpersuasive because it is not commensurate with the scope of the claim. Patent Owner's argument implies that the first metafile must correspond only to the first domain tag. Claim 1, however, contains no such requirement.

Upon review of the analysis in the Petition and the supporting evidence, and taking into account Patent Owner's arguments and evidence, we determine that Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103 over Wical and Lassila.

*3. Claim 2*

Claim 2 depends from claim 1 and requires additional limitations concerning the creation of an alpha portion and an index component for each record in the database. Ex. 1004, claim 2. Petitioner contends that Wical meets these additional limitations because Wical discloses a document theme vector. Pet. 31–33 (citing Ex. 1006, 2:63–67, 4:44–58, 33:37–42; Ex. 1001 ¶¶ 126–127). Upon review of the analysis in the Petition and the supporting evidence, we determine that Petitioner has shown by a preponderance of the evidence that claim 2 is unpatentable over Wical and Lassila. Patent Owner makes no arguments directed specifically to the additional limitations of claim 2.

*4. Claim 3*

Claim 3 depends from claim 1 and additionally requires that "the step of creating a first metafile, comprises the step[] of: selecting a first set of domain tags from the defined XML tags that are related to the first domain tag." Petitioner contends that Wical teaches this limitation because the directed graph includes information about how domain tags, such as "Leisure and Recreation" in Figure 4, are related to other domain tags, such as "Geography" in Figure 4. Pet. 33–34 (citing Ex. 1001 ¶ 136).

Patent Owner disputes that Wical's discloses this limitation. PO Resp. 14–18. According to Patent Owner, "Wical discloses that the domains relied on by the Petition are independent rather than related." *Id.* at 14 (citing Ex. 1006, 11:24–28). Further, Patent Owner argues that the connection between "Leisure and Recreation" and "Geography," depicted in Fig. 4 "is too remote to reasonably consider the two categories as related." PO Resp. 15 (citing Ex. 2001 ¶ 32; Ex. 2003, 95:14–96:13).

We are persuaded by Petitioner that Wical teaches selecting a first set of domain tags that are related to the first domain tag. Although Wical describes the ontologies for "Leisure and Recreation" and "Geography" depicted in Figure 4 as independent, Wical discloses linking and cross referencing categories and terms between the ontologies. *Id.* at 11:24–28, 11:36–55. Wical discloses that associations between categories, which may include high-level categories in the hierarchy of the directed graph, are manually made by linguists or by extracting information from documents. *See* Ex. 1006, 4:39–44, 6:8–20. Dr. Jagadish testifies that even high level categories may be related, though remotely, through cross references and links. Ex. 2003,[6] 91:12–93:3, 95:14–24. Claim 3 does not require any particular degree or strength of relationship between related tags, for instance, it does not preclude the relationship from being remote.

Dr. Papakonstantinou testifies that it would be unreasonable to create relationships between top level categories in Wical's different ontologies because it would contradict Wical's purpose of establishing separate ontologies and would create relationships that would be multiple traversal

[6] The record contains two Exhibits number 2003. We reference the one labeled "Replacement Exhibit 2003."

loops. Ex. 2001 ¶¶ 33–34. Dr. Papakonstantinou, however, fails to account for Wical's disclosure of the separate ontologies having cross references and links, including links that create loops between terms. *See* Ex. 1004, Fig. 4 (depicting links between the ontologies for "Leisure and Recreation" and "Geography," including links forming a loop between "France" and "Places of Interest").

Upon review of the analysis in the Petition and the supporting evidence and taking into account Patent Owner's arguments and evidence, we determine that Petitioner has shown by a preponderance of the evidence that claim 3 is unpatentable under 35 U.S.C. § 103 over Wical and Lassila.

*5. Claims 5 and 6*

Claim 5 depends from claim 3 and additionally requires "creating a hierarchy between the tags in the metafile." Claim 6 depends from claim 1 and additionally requires "creating a hierarchy between the tags in the first set of XML tags," which are related to the first domain tag.

Petitioner contends that Wical meets the additional limitations because Wical discloses creating a hierarchy between the tags in the metafile. Pet. 33–37 (citing Ex. 1006, 6:8–20, 11:14–45, 11:56–65, Fig. 4). Patent Owner argues that Wical does not teach creating a hierarchy because Wical does not teach creating a priority between the tags in a metafile that are related to the first domain tag. PO Resp. 23–24.

Patent Owner's argument is unpersuasive because it is not commensurate with the scope of the claims. As discussed above, when given the broadest reasonable interpretation in light of the specification of the '434 patent, the step of creating a hierarchy does not require creating a

priority between the tags and does not preclude creating a tree structure having a category-subcategory relation. Under the broadest reasonable interpretation in light of the specification of the ’434 patent, Wical meets the claimed step of creating a hierarchy. As pointed out in the Petition (Pet. 33–37), Wical discloses that its categories are arranged in a hierarchy. *See* Ex. 1006, 6:8–20 (“hierarchy of categories”), 11:14–45 (“classification hierarchy”), 11:56–65, Fig. 4.

Upon review of the analysis in the Petition and the supporting evidence, and taking into account Patent Owner’s arguments and evidence, we determine that Petitioner has shown by a preponderance of the evidence that claims 5 and 6 are unpatentable under 35 U.S.C. § 103 over Wical and Lassila.

*b. Morita and Lassila*

Petitioner contends that claims 1–3, 5, and 6 are unpatentable over Morita and Lassila. Pet. 51–58. Petitioner supports its contention with a declaration of Dr. Jagadish. Ex. 1001 ¶¶ 208–265.

*1. Morita*

Morita is titled “Document Retrieval System.” Ex. 1007, [54]. Morita discloses a document retrieval system that uses a keyword connection table to retrieve relevant documents. *Id*. at [57]. The keyword connection table includes relationship information that connects two keywords. *Id*.

Figure 1 of Morita is reproduced below.

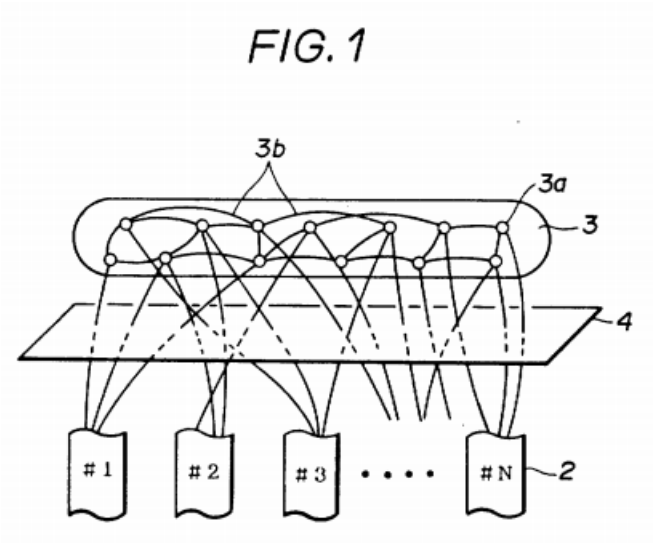



Figure 1 illustrates the document retrieval system. Documents 2 are made to correspond with keywords 3 by an invert file 4. *Id*. at 3:36–39. Invert file 4 indicates the relationships between the documents and the keywords that are extracted from the document. *Id.* at 4:37–43, 5:20–21.

Keyword connection layer 3 includes keywords 3a and keyword connections 3b. *Id*. at 3:39–43. The keywords and keyword connections are managed by a keyword connection table. *Id*. at 4:24–25, 7:29–32. Figure 6 of Morita is reproduced below.

FIG.6

| | | | | | | |
|---|---|---|---|---|---|---|
| KW1 (COMPANY R) | | | | | | |
| "TECHNICAL TIE-UP" 50 | KW2 (BTT) | | | | | |
| " R&D" 30 | " R&D" 40 | KW3 (COMMUNI-CATION) | | | | |
| "INCLUDING" SAME TEXT 80 | *** 0 | " SYNONYM" 20 | KW4 (NERVE CELL) | | | |
| *** 0 | *** 0 | *** 0 | " ALSO KNOWN AS" 70 | | | |
| " IS-A" 90 | " IS-A" 50 | *** 0 | *** 0 | | KWM-1 (ENTER-PRISE) | |
| "INCLUDING" SAME TEXT 80 | *** 0 | *** 0 | "INCLUDING" SAME TEXT 80 | | *** 0 | KWM (IMAGE) |

Figure 6 depicts an exemplary keyword connection table. As can be seen in Figure 6 above, the keyword connection table includes keywords, such as "COMPANY R" and "ENTERPRISE" and relationship information, such as "IS-A."

To retrieve documents, keywords are identified from the user's search request and the keyword connection table is used to identify related keywords. *Id*. at 5:41–52. The related keywords are presented to a user to determine if they are relevant. *Id.* at 9:36–45. The relevant keywords are then used to retrieve documents. *Id*.

*2. Claim 1*

Petitioner contends that Morita teaches all of the limitations of claim 1, except for the tags being XML tags. Pet. 51–54. In particular, Petitioner contends that Morita discloses an inverted file, which is an index used to search the database and keyword connection tables, which are metafiles that correspond to domain tags. *Id.* at 51–53. Petitioner argues that Morita is silent as to the syntax used to create Morita's keywords and keyword connection table, and that Lassila teaches using XML as a syntax for

implementing metadata. *Id*. at 38–39. Petitioner argues that "[i]t would have been a predictable use of prior art elements and known techniques for a [person of ordinary skill in the art] to use XML to implement Morita's document retrieval system." *Id.* at 40 (citing Ex. 1001 ¶¶ 28, 263–264).

Patent Owner does not dispute Petitioner's assertion that it would have been obvious to implement Morita's teachings using XML (*see* Tr. 21:12–14 ("Lassila was used for the same premise in both [instituted grounds] namely that XML tags would have been obvious, and we're not disputing that.")). *See NuVasive*, 841 F.3d at 974 (The Board need only make factual findings as to the limitations that the Patent Owner challenges.). Patent Owner, however, disputes that Morita teaches the steps of creating the index and the step of creating a first metafile recited in claim 1, because Morita does not teach that its invert file is a distinct structure from its keyword connection table. PO Resp. 25–27.

As discussed above, the broadest reasonable interpretation in light of the Specification of the '434 patent of the claimed steps does not require that the index and the first metafile be separate and distinct data structures. When given the broadest reasonable interpretation in light of the specification of the '434 patent, Morita meets the claimed steps of creating an index and creating a first metafile. As the Petition points out (Pet. 51–53), Morita discloses creating an invert file (i.e., an index) and creating a keyword connection table (i.e., a first metafile). *See* Ex. 1007, 1:64–67, 2:14– 17, 3:36–39, 4:51–56, 5:20–23; Ex. 1001 ¶¶ 213, 220.

Upon review of the analysis in the Petition and the supporting evidence, and taking into account Patent Owner's arguments and evidence,

we determine that Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103 over Morita and Lassila.

*3. Claim 2*

Claim 2 depends from claim 1 and recites additional limitations requiring the creation of an alpha portion and an index component for each record in the database. Ex. 1004, claim 2. Petitioner contends that Mortia teaches the additional limitations because Morita discloses that each database record contains identifying bibliographic information for a document. Pet. 54–55 (citing Ex. 1007, 4:37–50; Ex. 1001 ¶¶ 227–228). Upon review of the analysis in the Petition and the supporting evidence, we determine that Petitioner has shown by a preponderance of the evidence that claim 2 is unpatentable over Morita and Lassila. Patent Owner makes no arguments directed specifically to the additional limitations of claim 2.

*4. Claim 3*

Claim 3 depends from claim 1 and additionally requires that "the step of creating a first metafile, comprises the steps of: selecting a first set of domain tags from the defined XML tags that are related to the first domain tag." Petitioner contends that Morita teaches this limitation because Morita discloses creating a keyword connection table for a domain tag, such as "ENTERPRISE," having relationships to other keywords, including other domain tags, which are selected automatically or manually added by the user. Pet. 55–56 (citing Ex. 1007, 3:36–4:3; Ex. 1001 ¶ 237). Patent Owner disputes that Morita discloses this limitation because the keyword connection table shown in Figure 8 contains only the "ENTERPRISE" domain tag. PO Resp. 27–30.

We are persuaded by Petitioner that Morita teaches this limitation. As the Petition indicates (Pet. 56), Morita teaches that relationships between keywords, such as ENTERPRISE, are created when generating a keyword connection table. *See* Ex. 1007, 3:36–4:3, 14:23–55. Petitioner's declarant Dr. Jagadish testifies that "[i]f the domain tag $KW_{M-1}$ ('ENTERPRISE') is related to other domain tags, those relationships will also be added to its keyword connection table entries." Ex. 1001 ¶ 237. Patent Owner's argument is unpersuasive because Patent Owner fails to account for these teachings of Morita.

Upon review of the analysis in the Petition and the supporting evidence, and taking into account Patent Owner's arguments and evidence, we determine that Petitioner has shown by a preponderance of the evidence that claim 3 is unpatentable under 35 U.S.C. § 103 over Morita and Lassila.

*4. Claims 5 and 6*

Petitioner contends that Morita teaches the additional limitations recited by claims 5 and 6 concerning creating a hierarchy between the tags in the metafile. According to Petitioner, Morita discloses creating a hierarchy between the tags in the metafile. Pet. 57–58 (citing Ex. 1007, 3:36–4:3, 14:23–55; Ex. 1001 ¶ 246). Patent Owner argues that Morita does not teach creating a hierarchy because Morita does not teach creating a priority between the tags in a metafile that are related to the first domain tag. PO Resp. 30–36.

Patent Owners argument is unpersuasive because it is not commensurate with the scope of the claims. As discussed above, when given the broadest reasonable interpretation in light of the specification of

the ’434 patent, the step of creating a hierarchy does not require creating a priority between the tags and does not preclude creating a tree structure having a category-subcategory relation. When given broadest reasonable interpretation in light of the specification of the ’434 patent, Morita teaches the claimed step of creating a hierarchy. As the Petition points out (Pet. 57–58), Morita discloses that the keyword connection table stores relationship information that includes different relationship types. *See* Ex. 1007, 3:36–4:3, 14:23–55. Petitioner’s declarant Dr. Jagadish explains that “[f]or example, . . . Fig. 5 . . . shows that $KW_1$ (“COMPANY R”) is related to keyword $KW_{M-1}$ (“ENTERPRISE”) hierarchically through an “IS-A” relationship. That is, “COMPANY R” is an “ENTERPRISE.” Ex. 1001 ¶ 246.

Upon review of the analysis in the Petition and the supporting evidence, and taking into account Patent Owner’s arguments and evidence, discussed above, we determine that Petitioner has shown by a preponderance of the evidence that claims 5 and 6 are unpatentable under 35 U.S.C. § 103 over Morita and Lassila.

## III. CONCLUSION

We conclude Petitioner has proven, by a preponderance of the evidence, that claims 1–3, 5, and 6 of U.S. Patent No. 6,510,434 B1 are unpatentable under 35 U.S.C. § 103.

This is a final written decision of the Board under 35 U.S.C. § 318(a). Parties to the proceeding seeking judicial review of this decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

## IV. ORDER

Accordingly, it is hereby:

ORDERED that claims 1–3, 5, and 6 of U.S. Patent No. 6,510,434 B1 are held unpatentable.

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