

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**AMERICAN AIRLINES, INC., AND HILTON DOMESTIC OPERATING
COMPANY, INC.,**

Petitioners

v.

R2 SOLUTIONS LLC

Patent Owner

***Inter Partes* Review No. IPR2023-00666**

U.S. Patent No. 8,341,157

PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. 312

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Petitioner's Exhibit List

Exhibit	Description
1001	U.S. Patent No. 8,341,157 (the “’157 patent”)
1002	Prosecution History of the ’157 patent
1003	U.S. Patent No. 8,375,048 to Wad (“Wad”)
1004	U.S. Publication No. 2007/0294240 to Steele (“Steele”)
1005	U.S. Publication No. 2004/0199496 to Liu (“Liu”)
1006	U.S. Publication No. 2008/0082518 to Loftesness (“Loftesness”)
1007	U.S. Publication No. 2003/0208473 to Lennon (“Lennon”)
1008	U.S. Publication No. 2006/0173985 to Moore (“Moore”)
1009	Claim Construction Memorandum Opinion and Order, <i>R2 Solutions LLC v. Deezer S.A.</i> , No. 4:21-CV-90 (E.D. Tex. Jan. 04, 2022), ECF No. 45
1010	Declaration of Jimmy Lin, Ph.D. In Support of Petition For <i>Inter Partes</i> Review of U.S. Patent No. 8,341,157
1011	Jimmy Lin, Ph.D. <i>curriculum vitae</i>
1012	Scheduling Order, <i>R2 Sols. LLC v. American Airlines Inc.</i> , No. 4:22-cv-00353, Dkt. 20 (E.D. Tex. Oct. 7, 2022)
1013	Notice of Docketing to the Court of Appeals to the Federal Circuit, <i>R2 Sols. LLC v. Deezer S.A.</i> , 4:21-cv-00090, Dkt. 45 (E.D. Tex. July 21, 2022)
1014	Plaintiff’s Disclosure of Asserted Claims and Infringement Contentions, <i>R2 Sols. LLC v. American Airlines Inc.</i> , No. 4:22-cv-00353 (E.D. Tex. Oct. 13, 2022)

Exhibit	Description
1015	DocketNavigator Report for U.S. Patent No. 8,341,157 (last updated February 27, 2023)
1016	Declaration of Bill Davis in Support of Plaintiff's First Amended Complaint for Patent Infringement, <i>R2 Solutions LLC v. FedEx Corporate Services, Inc.</i> , No. 4:21-cv-00940 (E.D. Tex. Apr. 15, 2022), ECF No. 18-7.
1017	Listing of Claims of U.S. Patent No. 8,341,157
1018	Plaintiff's Complaint for Patent Infringement, <i>R2 Sols. LLC v. Hilton Domestic Operating Company, Inc.</i> , No. 3:22-cv-02761, Dkt. 1 (N.D. Tex. Dec. 12, 2022)
1019	Plaintiff R2's Opening Claim Construction Brief, <i>R2 Sols. LLC v. American Airlines Inc</i> , No. 4:22-cv-00353, Dkt. 42, (E.D. Tex. Feb. 21, 2023)

I. INTRODUCTION

The '157 patent is directed to identifying a user's intent from a query and presenting Internet search results targeted to said intent. But these techniques were routine in the art, as the prior art in this petition demonstrates. For example, Wad describes multiple techniques for identifying a user's intent to return more relevant search results. And Steele teaches creating a presentation of Internet search results formatted to a user's intent. The combination of Wad and Steele renders obvious determining a user's intent from a query and presenting search results targeted to that intent as recited in independent claims 1 and 2. The '157 patent's dependent claims recite conventional techniques for determining a user's intent (claims 3-10), ranking search results (claim 11), and customizing the presentation of data objects using presentation rules (claims 12-23). Liu, Loftesness, Lennon, and Moore recite these conventional elements. Accordingly, the Board should institute review and cancel claims 1-23.

II. STATEMENT OF PRECISE RELIEF REQUESTED FOR EACH CLAIM CHALLENGED

A. Claims for Review and Statutory Grounds of Challenge

Petitioners request the review and cancellation of claims 1–23 (the “Challenged Claims”) of the '157 Patent under 35 U.S.C. §§ 311-319 in view of:

Prior Art	
U.S. Patent No. 8,375,048 to Wad (EX-1003); filed January 20, 2004; prior art under pre-AIA 35 U.S.C. §102(e)	
U.S. Publication No. 2007/0294240 to Steele (EX-1004); published on December 20, 2007; prior art under pre-AIA 35 U.S.C. §102(b)	
U.S. Publication No. 2004/0199496 to Liu (EX-1005); published on October 7, 2004; prior art under pre-AIA U.S.C. §102(b)	
U.S. Publication No. 2008/0082518 to Loftesness (EX-1006); published on April 3, 2008; prior art under pre-AIA §102(b)	
U.S. Publication No. 2003/0208473 to Lennon (EX-1007); published on November 6, 2003; prior art under pre-AIA §102(b)	
U.S. Publication No. 2006/0173985 to Moore (EX-1008); published on August 3, 2006; prior art under pre-AIA §102(b)	

Grounds	
1	Wad in view of Steele renders obvious claims 1-3, 6-7, and 11 under 35 U.S.C. §103.
2	Wad in view of Steele and Liu renders obvious claims 4-5 under 35 U.S.C. §103.
3	Wad in view of Steele and Loftesness renders obvious claims 6 and 8-10 under 35 U.S.C. §103.
4	Wad in view of Steele and Lennon renders obvious claims 12, 15-16, and 19-23 under 35 U.S.C. §103.
5	Wad in view of Steele, Lennon and Moore renders obvious claims 13-14 and 17-18 under 35 U.S.C. §103.

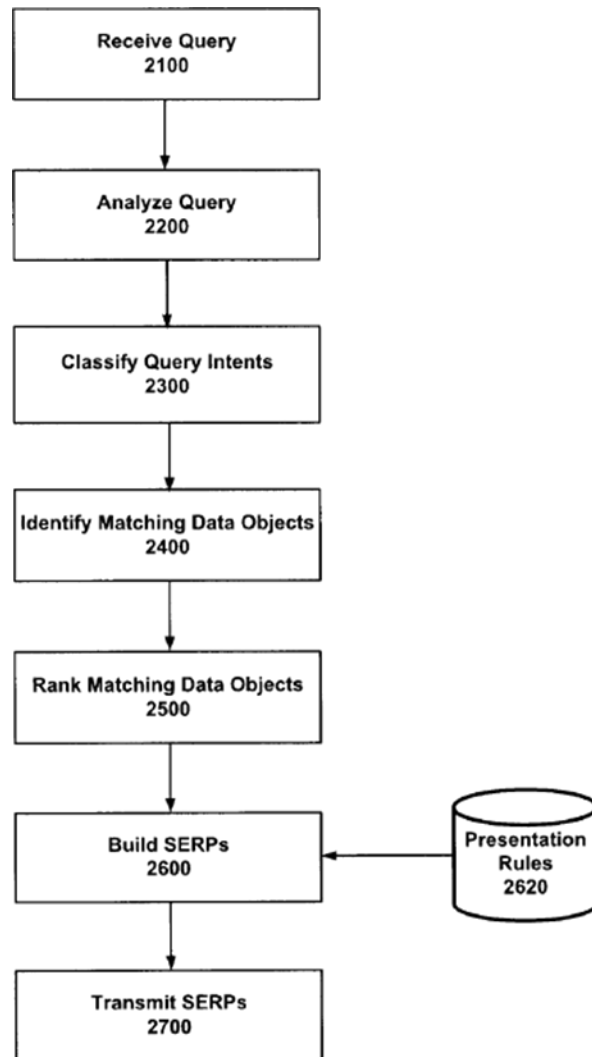
III. THE '157 PATENT

A. Overview of the '157 Patent

The '157 patent is directed to “intent driven search presentation.” '157 patent, Abstract. The disclosed method includes receiving a query and classifying it into an intent; identifying and ranking data objects that match a query keyword; assigning at least one intent to some of the data objects; and building a result using the ranked data objects and the assigned intent. *Id.*; EX-1010, ¶35.

The patent explains that “[a]n intent is a mapping from many combinations of keywords to a relatively small set of common goals that users pursue in a search query.” '157 patent, 9:44-47, *see also id.*, 3:46-57. For example, a user entering the single word query “rainforests” may intend to “obtain information on traveling to a rainforest,” purchase “CDs or books having rainforests as a subject,” or purchase “rainforest themed merchandise.” *Id.*, 3:46-57; EX-1010, ¶36.

Figure 2 depicts an exemplary process for intent-driven search presentation:



'157 patent, Fig. 2.

At step 2100, a query comprising “query tokens” is received from a user over a network. *Id.*, 9:26-35. At step 2200, the query is analyzed, and “keywords within the query are identified” including by parsing the query “into tokens.” *Id.*, 9:36-41; EX-1010, ¶¶38-39.

At step 2300, the query is classified into one or more intents. '157 patent, 4:17-36, 9:42-61, 11:53-63. At step 2400, data objects matching the query, which can include “documents such as web pages,” are identified “using any conventional search engine technology.” *Id.*, 9:62-10:3, 12:3-5. The data objects are ranked at step 2500 “using any ranking algorithm known in the art,” which may include ranking by intent. *Id.*, 10:4-22; EX-1010, ¶¶40-42.

Finally, search engine results pages are built (step 2600) and transmitted over the network to the user (step 2700). '157 patent, 10:38-41. The patent purports to improve the displayed search results by customizing their display based on user intent by, for example, “customiz[ing a] title or abstract for the result[s].” *Id.*, 4:17-27; EX-1010, ¶43.

The patent explains that “presentation rules” are applied to “tailor the display of search results for a webpage.” '157 patent, 4:37-41, 10:49-57. Presentation rules may originate from a feed or file in an XML schema. *Id.*, 6:7-9. These rules may include media rules that display URIs to media objects like images, videos, or audio files. *Id.*, 5:25-51. Similarly, they may include structured-data rules based on key-value pairs that display information like prices, reviews, or ratings. *Id.*; EX-1010, ¶44.

Claim 1 recites a method generally corresponding to the process shown in Figure 2. Independent claim 2 mirrors claim 1 but recites a computer-readable medium. Dependent claims 3-10 recite techniques for classifying a query and determining user intent. Dependent claim 11 describes ranking search results by intent. Dependent claims 12-23 recite different ways of customizing the presentation of data objects using presentation rules.

B. Level of Skill in the Art

Based on the relevant factors, *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995), a person of ordinary skill in the art (“POSITA”) would have had at least a four-year college degree in computer science, computer engineering, or a closely related field and have at least one year of experience in researching, designing, or developing processes for information search, retrieval, and presentation. *See, e.g.*, ’157 patent, 1:14-18, EX-1010, ¶¶50-51. Additional education could substitute for professional experience, and significant work experience could substitute for formal education. EX-1010, ¶¶50-51.

C. Claim Construction

In an unrelated case, the Eastern District of Texas construed several terms:

<u>Term</u>	<u>Construction</u>
“intent(s)” (Claims 1, 2)	plain meaning
“determining, at least the one computing device...” (Claim 1)	“determining, <i>using the</i> at least one computing device...”

“the query is classified by linguistic analysis of the at least one query keyword” (Claim 5)	plain meaning
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EX-1009, 34, 40, 42.

In the District Court dispute between Petitioner American Airlines, Inc. (“American”) and Patent Owner, Patent Owner and American are engaging in claim construction briefing at the time of filing of this Petition (*see* EX-1019) and American¹ has proposed the following constructions for the ’157 patent:²

Claim Term	American Proposal
“intent(s)”	“a mapping from many combinations of keywords to a set of common goals that users pursue in a search query or session of multiple queries”
“ranking”	plain and ordinary meaning, which is “assigning a rank”
“keyword”	“a characteristic word, phrase or code in a query used to perform searching operations”
“classifying the query ... into at least one/a subset of the plurality of intents”	“assigning the query to one or more of the plurality of intents determined from the at least one query keywords”

¹ In the District Court dispute between Petitioner Hilton Domestic Operating Company, Inc. (“Hilton”) and Patent Owner (the “Hilton Litigation”), Hilton and Patent Owner have not yet engaged in claim construction.

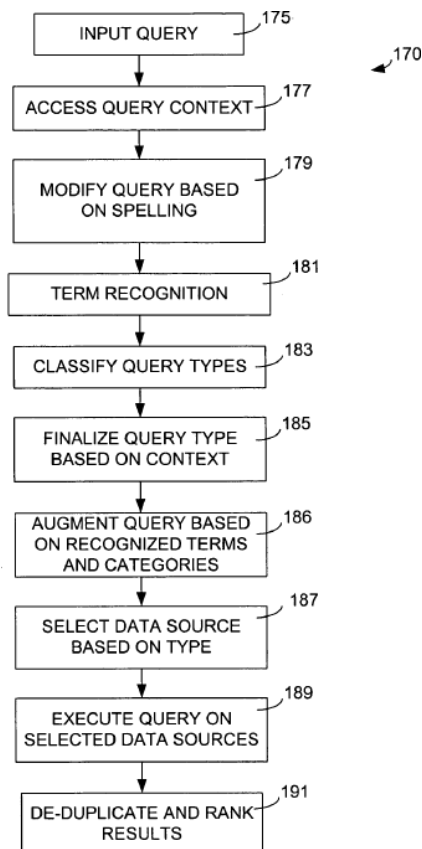
² R2 asserts the ’157 patent terms should be given their plain and ordinary meaning. Ex-1019.

The Board need not expressly construe these terms, however, because the Petition shows that the '157 patent claims are invalid under any plausible construction, including American's proposed constructions.

IV. THE SCOPE AND CONTENT OF THE PRIOR ART

A. Wad

Wad teaches analyzing and processing queries “to better match query results with a user intent.” Wad, 1:5-8. Wad’s analyzers “examine [a] query and deduce a query intent,” then augment the query with “terms that relate to the identified type or intent of the query.” *Id.*, 1:44-60, 3:10-17. Figure 3 shows an exemplary method for returning results:



Wad, Fig. 3; EX-1010 ¶53.

Wad discloses an algorithmic intent recognizer that “uses heuristic rules to ascribe a likely meaning to the words that the user typed” and employs pattern recognition techniques to assign an intent to those words. Wad, 4:14-36; EX-1010, ¶54. The algorithmic intent recognizer recognizes query intents like “Zip codes, email address[es], URLs, and UPS tracking numbers.” Wad, 4:34-36. Wad also discloses determining query intents with a list-match recognizer, which “uses a dictionary lookup list” containing a “word or phrase by itself, the candidate category, and the probability of [a] match.” *Id.*, 4:24-27, 4:37-58. For example, the word “Paris” in the search query “Paris Hotel in Las Vegas” may correspond to multiple intents, including the French city, a Las Vegas hotel, or travel more generally. *Id.*, 4:42-58. The list-match recognizer may identify multiple intents like seeking information about a hotel, a city, or travel. *Id.*, 4:42-53; EX-1010, ¶¶54-56.

Wad also augments the query with query augmentation terms that “characterize the intent of a term included in the original query.” Wad, 1:65-67, 3:49-4:18, 5:3-11; EX-1010, ¶57. And Wad locates relevant search results. *See* Wad, 5:56-6:46. In one embodiment, Wad gathers search results using federation engines, which access data objects from providers. *See id.*, 5:19-40, 5:56-6:10, Figs. 2-4.

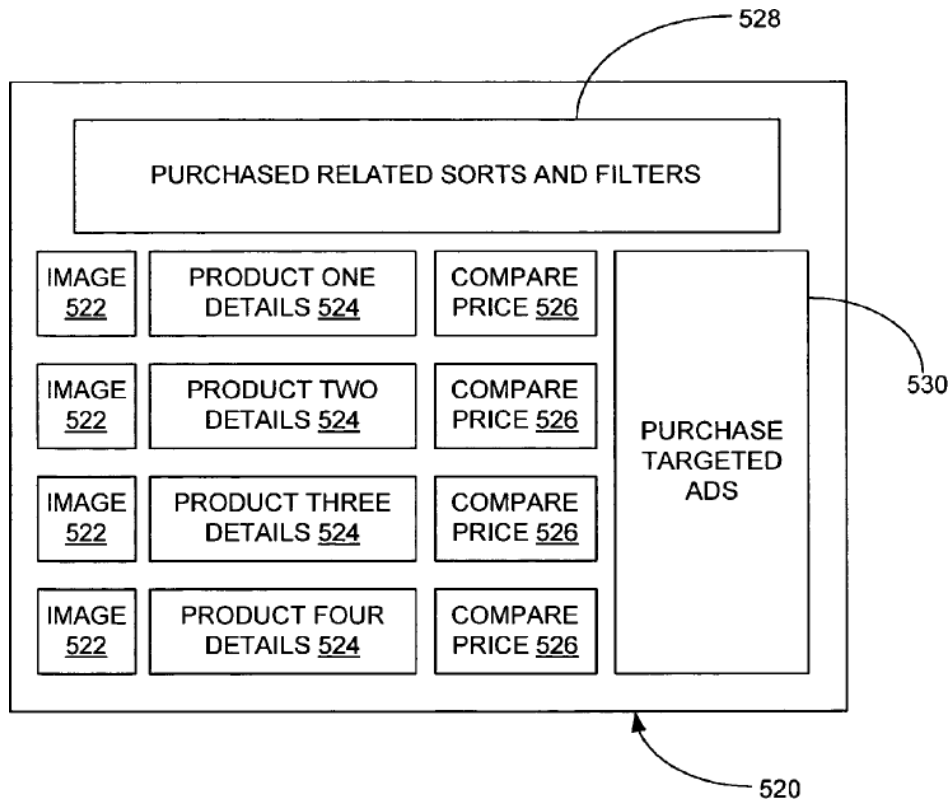
Wad ranks data objects using “query intent information” or other means. *Id.*, 6:53-63. Wad generates a customized presentation to a user in which “[w]ords and phrases on the title and description of a result that are similar or identical to those in the query” are highlighted. *Id.*, 7:15-19; EX-1010, ¶58.

B. Steele

Steele generates presentations “formatted in accordance with a format associated with [an] assigned intent.” Steele, Abstract. Steele applies “classification tags” to electronic documents that may correspond to certain user intents, such as a “research” intent or a “shopping” intent. *Id.*, ¶¶0005, 0021, 0024; EX-1010 ¶59.

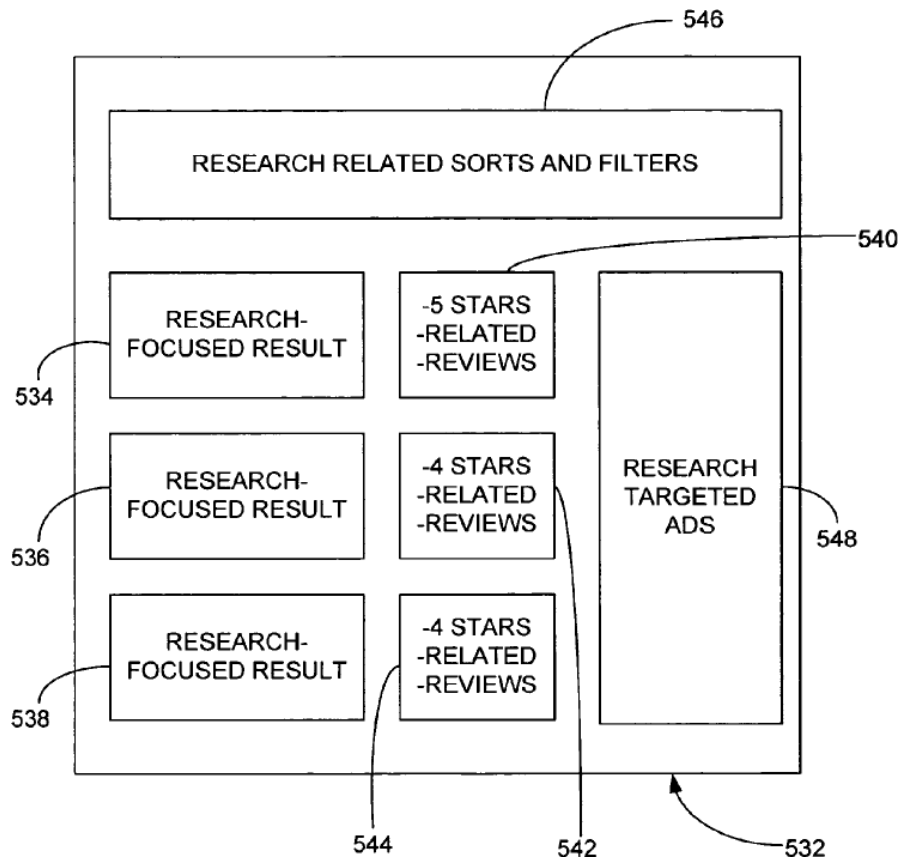
Steele associates classification tags from data objects with data connected to the data objects in a database. Steele, ¶0022, Fig. 2. For example, Steele may extract metadata for a product page that includes a “product price, product name, image” or other attributes, or it may extract ratings or a review summary from a “reviews” page. *Id.*; EX-1010, ¶60.

As shown in Figure 5B, Steele presents customized results displays containing particular metadata based on the user’s intent:



Steele, Fig. 5B; *see id.*, ¶¶0005, 0036; EX-1010, ¶61. For example, Fig. 5B depicts a presentation targeted to a user’s “purchase intent,” which includes metadata associated with data objects 524. *Id.*, ¶0038. Because the identified intent is “shopping,” Steele displays images 522 and pricing information 526 alongside the data objects. *Id.*; EX-1010, ¶61.

In another example, Steele identifies a “research” intent and customizes the presentation of search results by displaying reviews with the data objects to “strongly satisf[y] a research intent,” as shown in Fig. 5C:



Id., Fig. 5C, ¶0039; EX-1010, ¶62.

C. Liu

Liu associates query keywords with presentation items in a database to identify and select objects based on said keywords. Liu, Abstract; EX-1010, ¶63. Liu streamlines the arrangement of keywords and presentation items through canonicalization, which “improve[s] keyword-based presentation selection[] so that one presentation that is to be shown when a searcher indicates a particular intent can be shown over distinct searches.” Liu, ¶¶0014, 0045.

Canonicalization involves examining a search query and identifying canonical forms of query terms. EX-1010, ¶64. Liu illustrates various canonicalization types and corrections in Table 1 below:

TABLE 1

Canonicalization Type	Original Form	Canonical Form
Capitalization	“dallas cowboys”	“Dallas Cowboys”
Singular/Plural (possibly driven by a dictionary)	“dallas cowboy”	“Dallas Cowboys”
Word Order	“washington, george”	“George Washington”
Typographical Error	“washintong”	“Washington”
Typographical Error and Word Order	“washintong, george”	“George Washington”
Acronym	“AOL”	“America On Line”
Abbreviation	“cell phone”	“cellular phone”
Punctuation	“Bonnie & Clyde”	“Bonnie and Clyde”
Dictionary (This might be a demographic-specific canonicalization)	“automobile”	“car” and “auto”
Stop Words (remove protocol words)	“http:”, “https:”, “.html”, “www.”, etc.	“”
Stop Words (remove articles)	“the”, “an”, “a”	“”
Stop Words (remove propositions)	“of”, “to”, etc.	“”
Stop Words (remove conjunctions)	“and”, “or”, “nor”, etc.	“”

Liu, TABLE 1, *see also id.*, ¶0014.

D. Loftesness

Loftesness teaches techniques for providing query results based on user intent. Loftesness, Abstract. Loftesness analyzes previous queries by the user or other users and creates a “query classification table” that stores queries and related information about user intent. *Id.*, ¶0035. When a user enters a search query, Loftesness accesses

the query classification table “to determine the probable intent of the user” and generates intent-based search results. *Id.*, ¶¶0036, 0071; EX-1010, 65.

Loftesness describes multiple techniques, like using click data, for determining query intent. Loftesness, ¶¶0052, 0055, 0058, 0096-0099, Fig. 7; EX-1010, ¶¶66-67. Loftesness determines intent on a “user-by-user basis or a region-by-region basis.” *Id.*, ¶0058. Loftesness also analyzes “the collective behavior of a population of users” to determine user intent. *Id.*, ¶0036.

E. Lennon

Lennon describes a process for defining descriptors for online resources including web pages and using “presentation rules” for displaying different aspects of these resources. Lennon, ¶¶0079, 0316, 0370, 0397-0406, 0481; EX-1010, ¶¶68-70. Lennon defines “descriptors” for resources using an XML document to allow for “fast and efficient searching.” Lennon, ¶¶0081, 0109, 0316, 0385-0386, 0390, 0392. Lennon explains that a “descriptor associates a representation value to a feature.” *Id.*, ¶¶0085-0087, 0089, 0101-0102. Lennon also describes “presentation rules” specifying how a particular descriptor is presented, such as in a “graphical or pictorial manner” or with icons. *Id.*, ¶¶0370, 0395-0406.

Lennon likewise describes using “presentation rules” to generate displays. *See id.*, ¶¶0370, 0395-0406; EX-1010, ¶¶71-73. Lennon’s presentation rules include

representing description schemes and/or descriptors with graphics or pictures and may be grouped as a rule set. Lennon, ¶¶0395-0397.

F. Moore

Moore describes “RSS data feeds” and a feed-based search engine. Moore, Abstract, ¶0030. “RSS is an XML format for syndicating Web content” and Web documents. *Id.*, ¶¶0102, 0113, 0115. XML is a “widely accepted standard of the Internet community” and can define a security framework for web content. *Id.*, ¶¶0046, 0211, 0225, 0265, 0310-0321; EX-1010, ¶74.

Moore manages secure and insecure feeds using this framework. Moore, 0292, 0301; EX-1010 ¶75. These “RSS data feeds” describe how to present content items. Moore, ¶¶0102, 0115, 0138, 0167; EX-1010, ¶76. An RSS feed may feed an XML-enabled template and deliver “the first sentence of [an] abstract” or display “sub-segments” with a link accessible by a user. *Id.*, ¶0167. Using “XML grammar,” an “RSS-enabled server may include an RSS file with a title and description of items to be syndicated.” *Id.*, ¶0115.

V. GROUND 1 – WAD AND STEELE RENDER OBVIOUS CLAIMS 1-3, 6-7, AND 11

A. Introduction to Motivation to Combine Wad and Steele

A POSITA would have recognized the overlap between the intent-based search methods of Wad and Steele and would have been motivated to combine them with a reasonable expectation of success.³ EX- 1010, ¶79.

Wad recognizes that query terms alone may not completely reflect a user's intent. Wad, 1:5-34. Wad returns relevant results by determining a user's intent and then augmenting the query with terms that "characterize the intent of a term included in the original query." *Id.*, 1:65-67; EX-1010, ¶80. Wad searches external data resources through a federation broker or an index of webpages supplied by a web crawler. Wad, 3:11-33, Fig. 2. Wad's augmented query returns more relevant results because the augmented query runs on certain data sources that contain information that better reflects the user's intent. *Id.*, 1:38-43. Wad presents search results to the user with highlighting applied to words and phrases of data object titles and descriptions that are like those in the query. *Id.*, 7:15-19.

Steele also recognizes that "search terms themselves may not indicate a user's intent when making the query." Steele, ¶0004. Steele improves the relevance of a search result presentation by identifying a user's query intent and formatting the

³ As used herein, the phrases "found it obvious" and "motivated to combine" are used as shorthand to refer to a POSITA's motivation to combine with a reasonable expectation of success.

presentation reflecting that intent. *See id.*, ¶0005; EX-1010, ¶81. This allows Steele’s system to display content “targeted to that intent.” Steele, ¶0029.

Combining Steele’s teachings of displaying customized intent-based search presentations with Wad’s teachings of determining a query intent from query keywords and other contexts would have been the simple combination of known elements to obtain a predictable result and thus obvious to a POSITA. EX-1010, 82-83. The combination would use Wad’s teachings of receiving a query from a user, analyzing the query to identify at least one query keyword, determining a plurality of intents from the query keyword, classifying the query into an intent, and obtaining search results based on a query keyword, and Steele’s teaching of classifying the data objects into the assigned intent and creating a presentation of data objects customized to the user’s intent.

A POSITA would have been motivated to combine Steele and Wad for several reasons. First, Wad discloses applying intent-based search to an index of data objects gathered by a web crawler accessing the Internet, Wad, 3:19-33, Fig. 2, and while Wad discloses an index creation module 156, Wad provides few details regarding how the index creation module 156 categorizes data objects by intent. Steele discloses these implementation details by disclosing an index builder and a web crawler that applies classification tags that captures the potential intents of a user to

data objects located on the Internet. Steele, ¶¶0020-0024, 0033, Figs. 2-3. As explained in Section V.B.7, a POSITA would have looked to Steele’s teachings of building an index by classifying data objects with intent-based classification tags to supplement Wad’s disclosure of an index creation module. EX-1010, ¶83. Doing so would fully explain how Wad’s intent-based search could be used on a general-purpose search engine that crawls the Internet, as disclosed in Wad. *See infra* Section V.B.7.

Second, a POSITA would have been motivated to incorporate Steele’s intent-based results display techniques into Wad’s system. EX-1010, ¶84. As explained in Section V.B.10, a POSITA would have recognized that doing so would improve the usefulness of the combined system by ensuring that the search results or data objects displayed to the user were customized to the user’s intent, as taught by Steele and contemplated by Wad. *Id.*

B. Claim 1

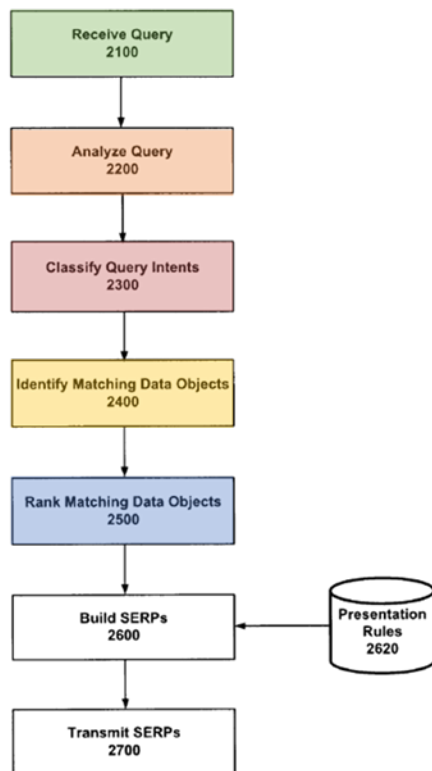
1. [1p] A method comprising the steps of:

Wad describes “*a method* and apparatus for query preprocessing and pipelining over a set of data sources to better match query results with a user intent.”⁴ Wad, 1:5-8, *see also id.*, 1:44-45, 4:59-5:2. Figure 3 of Wad shows a query

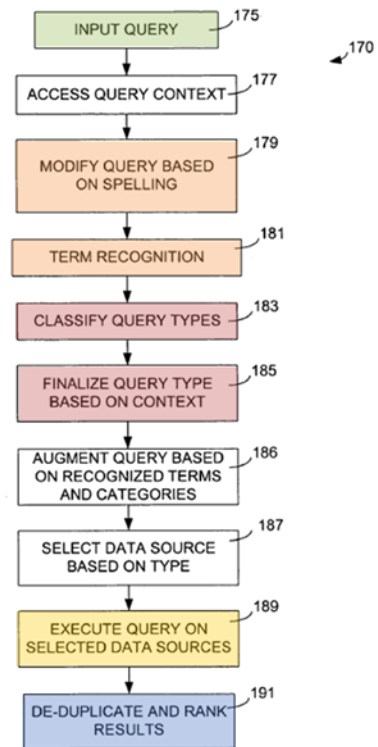
⁴ Emphases added except where indicated.

preprocessing method 170, which is performed by query processor 124. Wad, 4:59-60.

Wad's method recites similar steps to the '157 patent's disclosure:



'157 Patent, Figure 2 (annotated)



Wad, Figure 3 (annotated)

'157 patent, Fig. 2 (left); Wad, Fig. 3 (right); EX-1010, ¶¶ 85-86.

2. [1a] **receiving, over a network, a query from a user, the query comprising at least one query token;**

Wad describes receiving a query from a user over a network. EX-1010, ¶87.

Wad explains that a user “enters the query at a computer station 116 that is routed to a front end processor 10.” Wad, 3:19-20, 3:41-45. The front end processor 10 “receives a query from a user 116.” *Id.*, 2:31-36, *see also, id.*, 2:37-49, 3:19-21, 8:26-

52, Figs. 1, 2. The processor may be constructed in software executing on a computer system 20 (Fig. 1) and communicates to other servers or computers using a **network**.

Id.

Wad's queries comprise ***at least one query token***. EX-1010, ¶88. Wad teaches "[t]he query processor 124 parses the query on its individual elements by ***identifying the individual words*** of the query and any query language keywords that are embedded in a query." Wad, 3:49-52. Wad's ***identification of individual words of the query*** matches the '157 patent's disclosure that the "query is parsed into tokens" and that the "[q]uery tokens can comprise words." '157 patent, 9:33-41, *see also id.*, 11:49-52; EX-1010, ¶88.

Steele also teaches this element. EX-1010, ¶¶89-90. Steele teaches "the user 112 uses the client 102 to **input a search request** including ***one or more terms*** concerning a particular topic of interest" about relevant Web pages. Steele, ¶0017. Steele's system receives the query over a **data communication network 104, such as the Internet**" *Id.* ¶0016, Fig. 1. Steele discloses a front-end server that communicates with the client 102 to receive the user's search request. *Id.*, ¶¶ 0016- 0018, Fig. 1.

3. [1b] analyzing the query, using at least one computing device, to identify at least one query keyword;

Wad discloses that "[t]he query processor 124 **parses the query** on its individual elements by **identifying** the individual words of the query and **any query**

language keywords that are embedded in a query.” Wad, 3:49-52. Wad describes various query analysis techniques including spell checking query terms or grouping terms as phrases. *Id.*, 5:3-11; EX-1010, ¶¶91-92.

Wad’s techniques match the ’157 patent’s disclosure that “[t]he query is parsed into tokens, and the tokens can be analyzed to identify common entities, phrases, [and] spelling errors.” ’157 patent, 9:36-41; EX-1010, ¶93.

Wad further explains that query processor 124, which receives and analyzes the query to identify the keywords, is part of front end processor 10, which is typically implemented in computer system 20. Wad, 2:29-3:17, 3:19-52, Figs. 1, 2. Computer system 20 is an exemplary system for implementing the invention that includes “a general purpose computing device.” Wad, 7:41-46, Fig. 1. Query processor 124, front end processor 10, and computer system 20 (and their components) are thus “at least one computing device” as claimed. EX-1010, ¶94.

4. [1c] **determining, at least the one computing device, a plurality of intents from the at least one keyword, each of the plurality of intents indicates a type of information regarding the query keyword that is likely to be desired by a user submitting the query;**

Wad teaches determining, using the at least one computing device, a plurality of intents from the at least one keyword. EX-1010, ¶¶95-96. Wad discloses that “[a] query personalization or intent recognition module 212 **determines a probable intent or categorization of terms in the query based** on information about the given user

and information about typical users that have previously accessed the system.” Wad, 4:14-21. Intent recognition module 212 is part of query processor 124. Wad, Fig. 4, 3:47-4:13. As discussed above in element [1b], query processor 124, front end processor 10, computer system 20 and their components disclose the claimed “at least one computing device.”

Wad discloses multiple techniques to recognize intents from keywords in a search query, employing query analyzers 255, 256, 257. *See id.*, 4:14-58; EX-1010, ¶97. Wad teaches that “[a]n algorithmic intent recognizer uses heuristic rules to ascribe a likely meaning to the words that the user typed.” Wad, 4:21-36. For example, Wad discloses detecting phone numbers, Zip codes, email addresses, URLs, and package tracking numbers by analyzing patterns in the query tokens. *Id.*

Wad’s techniques determine a plurality of intents from a keyword. EX-1010, 98. For example, for the word “Paris,” Wad determines one intent related to the city and another related to the Paris Hotel in Las Vegas. *See* Wad, 4:37-58. Wad discloses using a dictionary lookup list that “contains a word or phrase by itself, the candidate category, and the probability of that match.” *Id.*, 4:37-58. In an example “if a user types a query like ‘Paris Hotel in Las Vegas,’ the list-match recognizer will indicate that specific parts of that query contain city (Paris, Las Vegas), hotel (Paris) and travel (hotel).” *Id.* Wad refers to the plurality of intents for each keyword as “query

category terms,” and it maps **query category terms** to **keywords in the query**. *Id.*, 4:54-58, 5:15-18.

Each of the plurality of intents identified in Wad indicates a type of information regarding the query keyword that is likely to be desired by a user. EX-1010, ¶99. Wad explains that the query augmentation terms “attempt to characterize the intent of a term included in the original query.” Wad, 1:65-67. The previous example of the keyword “**Paris**” illustrates the point. A user may desire information on the “**city**” **Paris** or the “**hotel**” **Paris**, each of which is a type of information regarding the query keyword “**Paris**.” For the query “Paris Hotel in Las Vegas,” Wad identifies intents for information about hotels, cities, and travel. *Id.*, 4:37-53. In another example, Wad explains that the term “**jaguar**” may refer to information about “**jaguar car dealerships**” or “**information about the population of jungle cats**.” *Id.*, 1:19-22.

Once Wad determines an intent of a query keyword, it augments the query with **query category terms** “that relate to the identified type or **intent of the query**.” *Id.*, 3:13-15. Wad uses the augmented query to access data sources of specialized information, although it may also use a web crawler accessing the Internet. *See id.*, 3:29-33, 5:56-6:10, Figs. 2, 3, and 4. These data sources contain information that is likely to be desired by the user, like “data about airfares [or] hotels,” “a list of churches in a country,” or “news, local, sports, encyclopedia, history, books, movies,

entertainment etc.” *Id.*, 2:50-62. Because Wad generates augmented queries ***based on an intent from a keyword*** and because the data sources containing different types of information are selected based on the augmented query, Wad’s intents “indicate[] a type of information regarding the query keyword that is likely to be desired by a user submitting the query,” as claimed. EX-1010, ¶100.

Wad’s disclosures mirror the ’157 patent’s use of intent. For example, like Wad, the ’157 patent identifies information about “travel” as a type of intent. *See* ’157 patent, 3:48-58 (“[b]y entering a ‘rainforest’ query, ***a user may wish to obtain information on traveling to a rainforest***”); EX-1010, ¶101.

5. [1d] **classifying the query, using the at least one computing device, into at least one of the plurality of intents;**

Wad discloses that “[b]ased on the presence of query terms that are mapped to corresponding query category terms, **the query type can be classified.**” Wad, 5:16-18; EX-1010, ¶102. Wad classifies the query at step 185, where “the **user’s likely intent is determined** based on query context.” Wad, 1:38-43, 3:60-4:13, 4:59-66, 5:15-23, Fig. 3. In the “jaguar” example above, Wad considers contextual information like previous queries searching for cars or whether the user is searching on a car seller’s webpage. *Id.*, 5:20-23. If so, “the ‘car meaning’ of the term jaguar will be used.” *Id.*

Wad discloses that the query processor [124] accesses the query analyzer broker 250 to gather intent information and uses subcomponents context builder 210 and intent recognizer 212. *Id.*, 3:60-63, 5:11-13, Figs 2, 4. As discussed above in element [1b], query processor 124, front end processor 10, computer system 20 and their components disclose the claimed “at least one computing device.” EX- 1010, ¶105.

Wad describes using contextual information to classify a query into one of the plurality of intents. *Id.*, ¶106. For example, Wad may determine that the user previously visited a “cars” website and may then classify the “jaguar” search query as a “cars” type query and not a “jungle cats” type query. Wad, 3:63-4:1, 5:19-23. Wad may also classify a query using previous queries executed by the user, the user’s age, zip code information, referring web sites, browser or operating system information, or user preferences. *Id.*, 4:6-13.

Wad’s selection of federation engines illustrates that Wad classifies the query into at least one of the plurality of intents. EX-1010, ¶105. Wad explains that federation engines are selected based on the identified query category terms. Wad, 5:56-6:10. For example, Wad may access a “travel federation engine” if “the query contains a city, a hotel, or a travel term in it, but would not call a travel provider otherwise.” *Id.*, 6:2-8. In example query “Paris Hotel in Las Vegas,” where Wad

identifies intents of city, hotel, or travel, Wad classifies this query into at least a “travel” intent when selecting the travel federation engine to find search results from a travel provider. *Id.*

6. [1e] **identifying, using the at least one computing device, a plurality of data objects available over the network that match the at least one query keyword;**

The '157 patent admits that identifying data objects that match a keyword is conventional and does not describe these conventional techniques. *See* '157 patent, 9:67-10:3, 12:3-5 (“The data objects could be matched to the query keywords using any conventional search engine technology known in the art such as a bag of words type match.”). Wad and Steele teach this conventional limitation; EX-1010, ¶106.

Wad teaches that query processor 124 identifies one or more data sources and **executes a query**. *See* Wad, 5:56-58, 6:33-40. After executing the query, a “response is provided to the user in the form of search results.” *Id.*, 2:40-48, 2:63-3:10, 3:52-4:13. Wad’s search results include “web sites,” Wad, 2:50-63, which are “data objects” as described in the '157 patent. *See* '157 patent, 4:1-5, 11:64-12:5. In some embodiments Wad teaches that an augmented query is used to identify data objects. Wad also identifies data objects with original query keywords. For example, Wad explains that when searching a data source “*the augmented category terms may be disregarded by the data source if desired.*” Wad, 5:34-40. In the process of

aggregating results, Wad applies highlighting to “[w]ords and phrases on the title and description of a result that are similar or *identical to those in the query.*” *Id.*, 7:15-18. Because Wad applies highlighting to data objects with words and phrases that *are identical to those in the query*, Wad teaches this element even if it searches for data objects with an augmented query. EX-1010, ¶¶106-110. And as discussed in element [1b], query processor 124, front end processor 10, computer system 20 and their components disclose the claimed “at least one computing device.”

Steele also teaches this limitation because Steele explains that back-end server 108 executes search engine application 114 to identify relevant search results (e.g., web pages) using the index 110 that “*correspond to one or more terms included in the search request.*” Steele, ¶¶0018-0019; EX-1010, ¶¶111-112.

7. [1f] assigning, using the at least one computing device, at least one of the plurality of intents to at least some of the plurality of data objects;

Wad discloses using a federation engine that searches certain categories of data objects from specialized providers. For example, Wad searches travel web sites for airfares and hotels, or religious web sites for information about churches. *See* Wad, 2:54-62, 6:23-32. Furthermore, Wad teaches searching an index of webpages (156) with a categorizer that is supplied by a web crawler that browses the Internet, *Id.*, 3:11-33, Fig. 2, although Wad provides few details on how the index is categorized. EX-1010, ¶113.

Steele assigns tags to data objects such as webpages using a page classifier 208. Steele, ¶¶0018-0024; EX-1010, ¶114. Some tags may indicate “how useful a page is to one or more respective user intents.” *Id.*, ¶0024. Some tags “may represent the potential intents of the user” and may indicate, for example, a webpage is relevant to “a user that intends to purchase a certain product.” *Id.*, ¶0033.

To generate intent-based tags, Steele employs an index builder 206 that receives information from a web crawler 202 and feeds 204. Steele, ¶0020, Fig. 3. The web crawler 202 is a program that browses the Internet, gathers information from Web pages, and submits information to the index builder 206. *Id.*, 0020-0021. The index builder includes a page classifier 208, which assigns “classification tags” to the documents received from the web crawler 202. *Id.* The index builder includes entity extractor 210, which extracts metadata from tagged documents that are dependent upon the documents’ types. *Id.*, ¶0022. For example, the entity extractor 210 may extract price, product name, or image metadata from a page tagged with a “product” classification tag, or the entity extractor may extract ratings or review summaries of products or content from a page tagged with a “reviews” classification tag. *Id.*, ¶0024; EX-1010, ¶115.

Tags corresponding to a user’s intent “may be the classification tags generated by the page classifier 208 and/or may be generated with reference to the

classification tags and the metadata.” Steele, ¶0024. In one example, “a document containing a product’s review and metadata associated with this review” is assigned a “research” intent. *Id.* In another example, “a document having a ‘buy’ button and metadata indicating pricing information” is assigned a “shopping” intent. *Id.* Steele explains that “intent tags generally relate to how a document is likely to be used by a user.” *Id.*; EX-1010, ¶116.

Steele assigns at least one of the plurality of intents to at least some of the data objects using a computing device. Steele explains that page classifier 208 assigns classification tags to various documents. Steele, ¶0021; EX-1010, ¶117. Page classifier 208 is a component of index builder 206, which is part of system 200. Steele, ¶0021, Fig. 2. Steele teaches that the system configurations include “general-purpose computers, specialty computing devices, [and] servers.” *Id.*, ¶0015.

To the extent that the Patent Owner argues that the ’157 patent requires first “identifying ... a plurality of data objects” and then “assigning ... at least one of the plurality of intents,” the ’157 patent does not support such a restriction. Figure 2 of the ’157 patent omits an “assigning” step, and the specification provides scant detail regarding the assigning step recited in the claims, disclosing its performance passively in a “wherein” clause. *See, e.g.*, ’157 patent, Fig. 2, Abstract (“wherein at least one intent is assigned to at least some of the data objects”), 1:43-49 (same),

2:5-14 (same). Nothing in the specification or the claims requires the assigning step to occur in a particular order, let alone after the “identifying” step. EX-1010, ¶118.

The ’157 specification supports that the assigning step may occur before the identifying step. The ’157 patent states that “an intent is a mapping from many combinations of keywords to a relatively small set of common goals that users pursue in a search query.” ’157 patent, 9:44-47. A POSITA would have understood that the set of intents used by a working system would have been finite and could be assigned to data objects based on the content of the data objects independently of the execution of a particular query. EX-1010, ¶119. In a related litigation, Patent Owner’s expert Mr. Davis agrees, stating that intents “exist as pre-programmed items within and/or accessible to the [system] architecture.” EX-1016, ¶78. Mr. Davis’s testimony aligns with the understanding that the “assigning” step may occur before a query or query results. EX-1010, ¶119.

Even if the claims required that the assigning step be performed after the identifying step (they do not), Steele teaches this too. Steele’s index builder 206, using page classifier 208, assigns intent tags to the various data objects and stores them in the index. Steele, ¶¶0021-0024. The search component 214 then receives a user’s search query and leverages the intent tags in the index to “determine how well

various results serve user intent in different situations.” *Id.*, ¶0025. A POSITA would have understood that determining how well certain results satisfy a user’s intent is a form of assigning an intent to the data objects that have been identified in the particular search. EX-1010, ¶120. Furthermore, Steele discloses that its steps do not need to be performed in “any particular order” and that “different steps or combinations of steps” may be used to practice its disclosures. Steele, ¶0013. Thus, a POSITA would have understood that Steele contemplated performing classification (e.g., assigning intents) at different stages in Steele’s process, including after the search results were returned. EX-1010, ¶120.

As explained above in Section V.A, a POSITA would have been motivated to combine Steele with Wad with a reasonable expectation of success. Wad discloses applying intent-based search to an index of data objects gathered by an Internet web crawler. Wad, 3:19-33, Fig. 2. Although Wad provides few details regarding how the index creation module 156 categorizes data objects retrieved from the Internet by intent, Steele provides these implementation details. Steele discloses an index builder and a web crawler that applies intent-based classification tags to data objects located on the Internet. Steele, ¶¶0020-0024, Figs. 2-3. A POSITA would have looked to Steele’s teachings of building an index by classifying data objects with intent-based classification tags to supplement Wad’s disclosure of an index creation

module. EX-1010, ¶121. Doing so would fully explain how to apply Wad’s intent-based search on a general-purpose search engine that accesses the Internet, as already disclosed in Wad.

A POSITA would have found it straightforward to incorporate Steele’s index builder 206, which assigns at least one of the plurality of intents to data objects, into Wad. *Id.*, ¶131. Wad already discloses an index creation module 156 with a web crawler 136. A POSITA would have combined the functionality of Steele’s index builder 206 with Wad’s index creation module 156 to achieve the desired and predictable result of enabling Wad’s index creation module 156 to categorize data objects crawled from the Internet by intent. *Id.* This would ensure that Wad’s intent-based search can be used with a general purpose search engine, as Wad expressly contemplates. *Id.*

8. [1g] ranking, using the at least one computing device, the plurality of data objects;

Claim 1 does not require data objects to be ranked in a particular way, nor does it require ranking data objects by intent. The patent admits that this element is conventional because “[t]he data objects can be ranked using any ranking algorithm known in the art.” ’157 patent, 10:5-9, 12:7-12; EX-1010, ¶123.

Wad teaches this element because Wad discloses that “[t]he query processing module 124 performs post processing operations 224 on the returned results,” which

includes “aggregate[ing] the results into a single sequence...using [business rules or ranking merging](#).” Wad, 6:47-62. Ranking merging is based on rank scores returned by the federation engines. *Id.*; Ex-1010, ¶124.

Steele also discloses ranking. EX-1010, ¶¶125-126. Steele teaches that “search component 214 may aggregate (i.e., group) the various documents by their related intents.” Steele, ¶0025. Steele also teaches that search component 214 “generates or refines targeted results for presentation to the user” “[b]ased on the identified intent,” and that the “presented results and/or their ranking depend on the identified intent.” Steele, ¶0036, *see id.*, ¶0026. Presentation component 218 then presents the results via a webpage. *Id.*, ¶0026. Both search component 214 and presentation component 218 are components of computer system 200. *Id.*, ¶¶0025-0026, Figs. 1, 2.

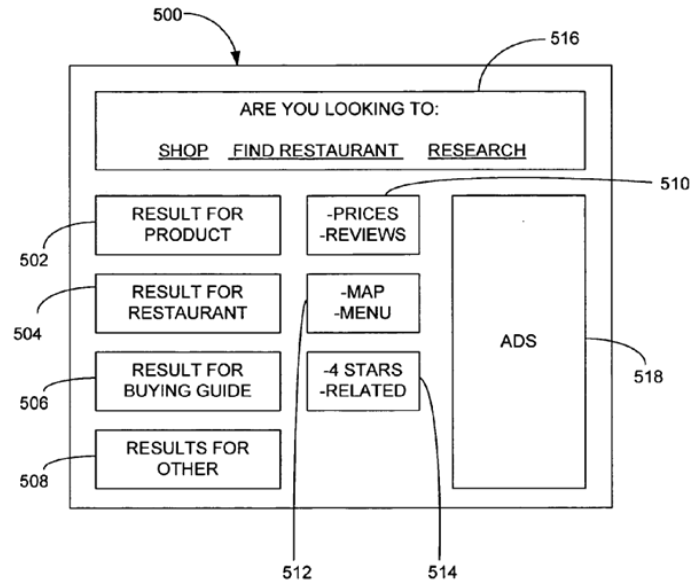
9. [1h] building a result, using the at least one computing device, using the ranked plurality of data objects, the result comprises a plurality of display entries,

Wad teaches this element. EX-1010, ¶127. Wad’s “query processing module 124 also performs post processing operations 224 on the returned results,” which includes de-duplication, re-federation, and applying highlighting to the results. Wad, 6:47-51, 7:9-18. As discussed in element [1b], query processor 124, front end processor 10, computer system 20 and their components disclose the claimed “at least one computing device.”

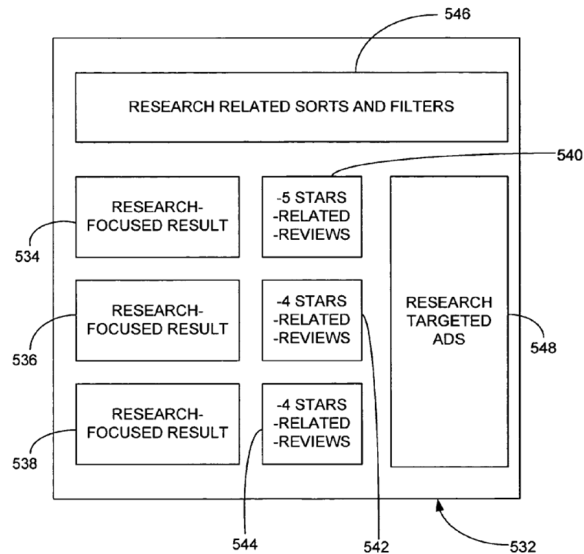
Wad's result comprises a plurality of display entries. For example, Wad discloses generating a presentation containing multiple responsive items, or "results." *Id.*, 6:63-7:19. Wad also discloses removing duplicate data entries or obtaining additional results if too few results remain from de-duplication. *Id.*; EX-1010, ¶128.

Steele also teaches this element. EX-1010, ¶129. Steele teaches the search engine returns the most relevant results from an index of electronic documents. Steele, ¶0032. Steele generates the targeted results for presentation to the user based on the identified intent. *Id.*, ¶¶0034, 0036, Figs. 5A-5C. The presentation may include presented results as well as "exposed metadata, controls and advertisements" targeted to the identified intent. *Id.* Steele's presentation is generated by presentation component 218. *Id.*, ¶0026, Fig. 2. Presentation component 218 is part of system 200. *Id.*, ¶¶0025-0026, Fig. 2. Steele teaches that the system configurations include "general-purpose computers, specialty computing devices, [and] servers." *Id.*, ¶0015.

Fig. 5A of Steele shows an exemplary display with multiple display entries (search results 502, 504, 506, and 508):



Id., Fig. 5A, ¶ 0037. Steele teaches building a result of display entries for a specified intent. EX-1010, ¶130. For example, Figure 5C depicts results 534, 536, and 538 alongside meta data 540, 542, and 544:



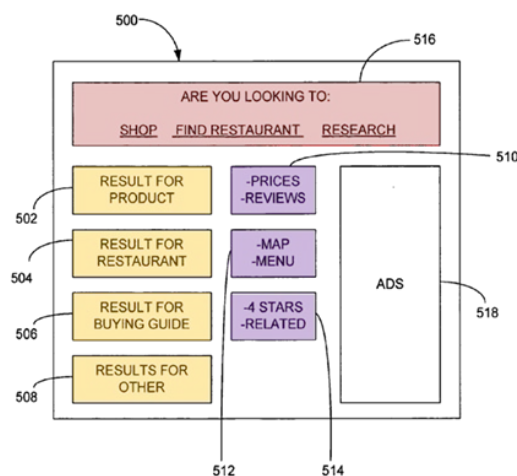
Id., Fig. 5C, ¶0039; EX-1010. ¶131. In another example corresponding to a shopping intent, Steele depicts building a result of four products alongside image data and

pricing data for each product. Steele, Fig. 5B, ¶0038; EX-1010, ¶132.

10. [1i] at least one display entry customized to a respective assigned intent is constructed for each of the ranked plurality of data objects; and

Steele teaches this element by presenting customized screen views of certain data objects with corresponding metadata customized for display based on the intent. Steele, ¶¶0033-0039, Figs 5A-5C. Steele further explains the displayed metadata relates to user intents. Steele, ¶0027; EX-1010, ¶137. Steele discloses actions that may be performed with regard to the presented results, and these actions may be a function of a page's type and available metadata. Steele, ¶0027; EX-1010, ¶137.

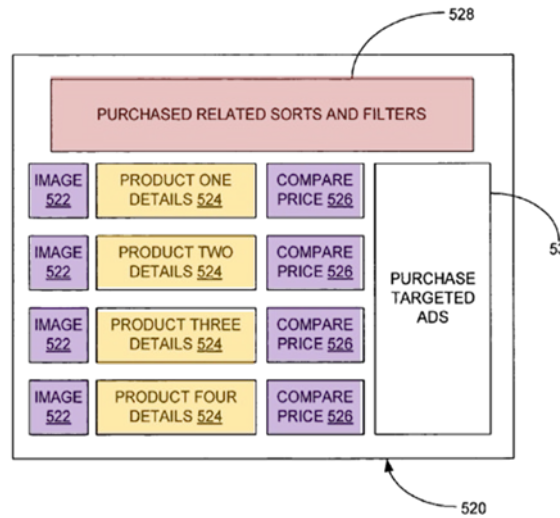
For example, the query “steak grill” may have three possible intents: “make a purchase,” “conduct research,” or “find a location.” Steele, ¶0037. Steele's Figure 5A shows a result with display entries customized for each potential intent:



Steele, Fig. 5A (annotated)

Steele, Fig. 5A (annotated), ¶0037; EX-1010, ¶¶133-134, 137-139. Customized display entries are constructed containing data objects shown in yellow adjacent to metadata reflecting the assigned intent of the data object. EX-1010, ¶139. Figure 5A depicts display entries customized to an assigned intent for three different data objects, 502, 504, and 506. Steele, Fig. 5A, ¶0037. A display entry is constructed depicting data object 502 adjacent to pricing and reviews metadata item 510 which customizes the display entry to a “purchase” intent. *Id.* A display entry is constructed depicting data object 504 adjacent to map data 512 which customizes the display entry for a “find a restaurant” intent. *Id.* Similarly, a display entry is constructed depicting data object 506 adjacent to metadata summarizing reviews 514 which customizes the display entry for a “research” intent. *Id.*

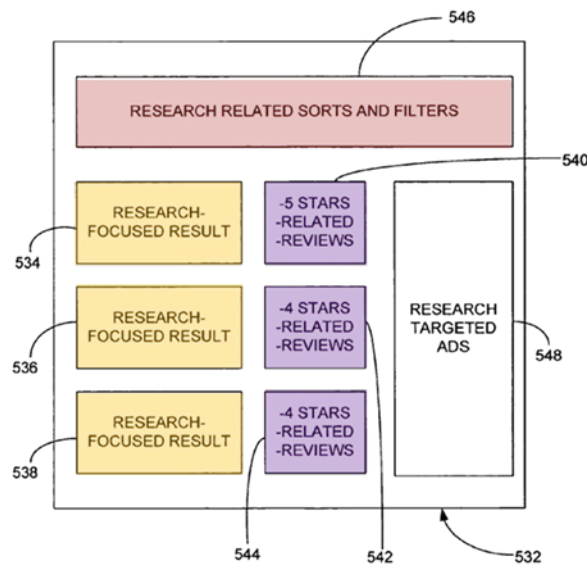
Steele also teaches a result with display entries customized to a single intent that match the intent of the user’s query. *See id.*, ¶¶0038-0039, Figs. 5B, 5C; EX-1010, ¶144-145. As shown in Fig. 5B, Steele customizes display entries to a “purchase” intent of a grill:



Steele, Fig. 5B (annotated)

Steele, Fig. 5B (annotated), ¶0038; EX-1010, ¶¶135-140. Screen display 520 “provides results targeted to such a purchase intent.” *Id.*, ¶0038; EX-1010, ¶135. Steele customizes a display entry to a respective assigned intent by displaying metadata related to the intent in the presentation. Steele, ¶¶0027-0028, 0031, 0034, 0037-0039. In Figure 5B, “[t]he screen display 520 includes images 522, product details 524 and product prices 526 for each of four different grills” and the exposed metadata is related to purchasing. *Id.*, ¶0037. Each display entry includes a presentation of customized display entries customized to an **assigned purchase-related intent** by displaying **images of the products** and a **comparison of pricing** for each product adjacent to **the data object** or the **product** result. *Id.*, Fig. 5B, ¶0038; EX-1010, ¶¶138-140.

Figure 5C depicts another example of display entries customized to a research intent. Results 534, 536, and 538 are customized with metadata 540, 542, and 544 containing review information that “strongly satisfies a research intent.” Steele, ¶0039, Fig. 5C; EX-1010, ¶¶136-140. The display entries are customized to an assigned **research related intent** by displaying **review information** adjacent to **data objects of the research-focused result**:



Steele, Fig. 5C (annotated)

Steele, Fig. 5C (annotated), ¶0039; EX-1010, ¶¶136-140.

Steele’s customizing a display with a picture, research data, prices, or a map matches the ’157 patent’s embodiments. The ’157 patent discusses “presentation attribute rules” for customizing a display based on an intent. The listed rules include “URI to a media object, such as an image, video or audio file” and “[s]imilar to

media, show a map if available (generated by the search engine using the location provided in the presentation rule).” ’157 patent, 5:30-45. The ’157 patent also lists “structured data” type presentation attribute rules, which include “key-value pairs” with example keys of “price, review, [or] ratings.” *Id.*, 5:33-36; EX-1010, ¶141.

It would have been straightforward for a POSITA to combine Steele’s displays, including its intent-based presentations, with Wad’s teachings. EX-1010, ¶142. A POSITA would have found it obvious to incorporate the functionality of Steele’s presentation component 218 in Wad’s result processing component 224 to provide intent-based search results as taught by Steele. *Id.* Wad already discloses a results processing component 224 as part of query processing module 124. Wad, 6:47-7:18, Fig. 4. The query processing module 124 applies hit highlighting and performs “personalized” ranked results based on user preferences. *Id.*, 7:2-18. “The response is then built and submitted back to the front end.” *Id.* Incorporating the functionality of Steele’s presentation component 218 into Wad’s query processing module 124 would simply be applying a known technique (Steele’s intent-based display of search results) to a known device (Wad’s query processing module) to achieve predictable results (displaying search results to the user based on the user’s intent).

A POSITA would have recognized that this combination would have improved the functionality of the overall system by ensuring that the presented results corresponded to the user's intent. EX-1010, ¶143. Wad contemplates this advantage when discussing highlighting search results based on the query. Wad, 7:15-19. Steele touts this advantage by explaining that displaying search results in accordance with the user's intent increases the relevance of the search results and allows the user to find desired information more easily. Steele, ¶¶0004-0005, 0036-0039.

11. [1j] transmitting the result, over the network, to the user.

Wad discloses this element by teaching “a result is formatted by the server 20 and transmitted back to the user.” Wad, 3:3-10; EX-1010, ¶144.

Steele also teaches this element. *E.g.*, Steele, Fig. 1 (“communication network 104”), ¶0016, ¶¶0036-0039 (describing sending the display results to a user); EX-1010, ¶145. Steele discloses that “[o]ne or more *servers* communicate with the client 102 *via the network 104*.” Steele, ¶0016. “The client 102 *employs the network 104*, the front-end server 106 and the back-end server 108 to access Web page data stored, for example, in a central data index (index) 110.” *Id.* Additionally, Steele explains that “[i]n one embodiment, *the presentation is presented via the Internet as a Web page*.” *Id.*, ¶0026.

C. Claim 2

Claim 2 recites a “computer-readable medium having computer-executable instructions for” a method substantively identical to that of claim 1. ’157 patent, 16:31-32. Wad-Steele discloses all elements of claim 2, for the reasons discussed regarding claim 1 and below. EX-1010, ¶146.

1. [2p] A computer-readable medium having computer-executable instructions for a method comprising the steps of:

To the extent the preamble is limiting, Wad discloses it. *See* Section V.B.1. Wad explains that the method of Figure 3 is “performed by the query processor 124 on an incoming query.” Wad, 4:59-60, Figs 2-4. The query processor 124 is a component of front end query processor 10. *Id.*, 3:47-48, Figs 3, 4. The front end query processor 10 is typically “constructed in software executing on a computer system 20 (Fig. 1) such as a server computer” that communicates over a network. *Id.*, 2:29-36, Figs. 1, 2. Computer system 20 is a general-purpose computing device with conventional processing and memory components. *Id.*, 7:41-46, Fig. 1. Moreover, Wad discloses that its embodiments implement “computer-executable instructions, such as program modules, being executed by a personal computer.” *Id.*, 7:21-8:52; EX-1010, ¶147.

2. [2a]-[2j] receiving...to the user.⁵

⁵ *See* EX-1017 for the full claim listing.

Wad-Steele discloses these elements of claim 2. *See* Section V.B.2 to V.B.11; EX-1010, ¶¶148-157. While element [2d] (“at least a subset of”) varies slightly from [1d] (“at least one of”), Wad discloses both limitations. Classifying the query into “at least one of” a plurality of intents teaches classifying the query into “at least a subset of” the plurality of intents because one intent is a subset of the plurality of intents. EX-1010, ¶151. Further, the Wad-Steele combination would have been obvious for the reasons discussed above. *See* Sections V.A, V.B.7, and V.B.10.

D. Claim 3

Wad discloses “wherein the at least one intent comprises an unclassified intent.” EX-1010, ¶158. In the ’157 patent, an “unclassified intent [is] when no defined intents match the query.” ’157 patent, 9:42-44.

Wad classifies a query into one of the plurality of intents. *See* Section V.B.5. For example, Wad determines a user’s intent in part by (a) determining if a query is a “local query” or (b) mapping query terms to corresponding category terms. Wad, 5:9-27, Fig. 3. Wad then augments the query with supplemental terms to align the query with the user’s intent. *Id.*, 1:65-67, 5:19-55. However, Wad discloses that a particular query may have neither “local patterns” nor “category terms” but may still return an augmented query. Figure 5 depicts the query augmentation process and contemplates augmenting the query when the query has neither local patterns (step 330, NO) nor category terms (step 350, NO) *Id.*, 5:41-55, Fig. 5. This corresponds

to the '157 patent's teaching of a query that does not match any defined intent. '157 patent, 9:42-44; EX-1010, ¶159.

To the extent that Wad does not expressly teach classifying the query into an unclassified intent, it would have been obvious to modify Wad to do so. A POSITA would have understood that a user's query may not always be categorized neatly into a classified intent, yet a user would still be interested in seeing search results based on its query. EX-1010, ¶160. A POSITA therefore, would have been motivated to modify Wad's system to classify the query into an unclassified intent and to return a search result accordingly. EX-1010, ¶160. A POSITA would have had a reasonable expectation of success with this modification as searching databases without first classifying was a conventional technique at the time the '157 patent was filed, *see, e.g.*, Wad, 1:12-34, and Wad expressly contemplates that its system is compatible with executing searches on multiple federation engines without any weighting from the intent recognizer. *See, e.g.*, Wad, 5:41-6:4; EX-1010, ¶161.

E. Claim 6

Wad teaches the additional limitation of claim 6 by disclosing using the user's profile information to classify the query. For example, Wad discloses determining query context using "previous queries executed by this user, age of this user, zip code of this user ... and user entered preferences such as the number of results or display preferences." Wad, 4:6-13; EX-1010, ¶162. Wad's disclosures mirror those

of the '157 patent. '157 patent, 9:56-57 (“user profile information such as preferences”), *see also id.*, 4:31-32, 11:58-59.

F. Claim 7

Wad teaches the additional limitation of claim 7 by disclosing classifying the query using previous queries submitted by the user during a user session. For example, Wad discloses determining query context using “previous queries executed by this user.” Wad, 4:6-13.

In addition to “previous queries executed by this user,” Wad also discloses that “queries recently entered by the user” and “the results to those queries that were selected by the user” in recent sessions are used as query context information to classify the query. *Id.*, 4:62-5:2, Fig. 3. A POSITA would have understood “queries *recently* entered by the user” to include queries submitted by the user within the same user session. EX-1010, ¶¶164-165.

G. Claim 11

Wad ranks the plurality of data objects by intent by applying “weighting values” or “confidence values” to the augmented query. Wad, 1:56-61, 4:1-5, 4:54-58, 5:19-40, 6:63-7:8. The weighting or confidence value reflects a “percentage indicator that indicates the amount of confidence that the augmented term [] reflects the true intent of the query.” *Id.*, 4:1-5. The confidence values associated with augmented terms are used to rank the results. *Id.*, 7:63-67. Because the confidence

values reflect a measure of the “true intent of the query,” and because the results are ranked by the confidence values, Wad discloses ranking the data objects by intent. EX-1010, ¶166. This resembles the ’157 patent embodiment, where ranking module 3500 ranks documents by assigning “a score...for each candidate result against multiple intents.” ’157 patent, 10:9-22, 12:19-22. Wad further discloses aggregating results into a single sequence of results by “rank merging,” wherein the “rank merge” is based on “query intent information” among other factors. Wad, 6:47-62.

Steele also teaches this element. *See* Steele, ¶0036 (“*In one embodiment, the presented results and/or their ranking depend on the identified intent.*”); EX-1010, ¶174.

VI. GROUND 2: WAD, STEELE, AND LIU RENDER OBVIOUS CLAIMS 4-5

A. Claim 4

Claim 4 recites identifying keywords in a query using methods that were well known in the art long before the ’157 patent. EX-1010, ¶169.

Wad discloses that the analysis step (e.g., Wad steps 179, 180) identifies query keywords by parsing the tokens and identifying *spelling errors* and *phrases*. Wad, 5:3-11; EX-1010, ¶170. *See also* Section V.B.3.

Further, Liu discloses that the analysis step identifies query keywords by identifying each group listed in claim 4. EX-1010, ¶¶171-173. Liu teaches

associating keywords using canonicalization where different keywords are treated as the same keyword. Liu, ¶0014. Canonicalizations “might include plural/singular forms, gender forms, stem word forms, suffix forms, prefix forms, typo graphical error forms, word order, pattern ignoring, acronyms, stop word elimination, etc.” *Id.*, ¶¶0014, 0045.

Liu’s substituting “washingtong, george” with “George Washington” identifies both *common entities* and *phrases*. *Id.*, ¶0048, Table 1. Liu’s correcting “washintong” to “Washington” identifies *spelling errors*. *Id.* Liu’s substituting “automobile” for “car” and “auto” identifies *synonyms*. *Id.*, ¶0048 Table 1. Liu’s converting “calling” to “call” identifies *variants of stems*. *Id.*, ¶0045. Liu’s removing protocol words, articles, propositions, or conjunctions identifies *noisewords*. *Id.*, ¶0048, Table 1; EX-1010, ¶174.

TABLE 1

Canonicalization Type	Original Form	Canonical Form
Capitalization	“dallas cowboys”	“Dallas Cowboys”
Singular/Plural (possibly driven by a dictionary)	“dallas cowboy”	“Dallas Cowboys”
Word Order	“washington, george”	“George Washington”
Typographical Error	“washintong”	“Washington”
Typographical Error and Word Order	“washintong, george”	“George Washington”
Acronym	“AOL”	“America On Line”
Abbreviation	“cell phone”	“cellular phone”
Punctuation	“Bonnie & Clyde”	“Bonnie and Clyde”
Dictionary (This might be a demographic-specific canonicalization)	“automobile”	“car” and “auto”
Stop Words (remove protocol words)	“http:”, “https:”, “html”, “www.”, etc.	“”
Stop Words (remove articles)	“the”, “an”, “a”	“”
Stop Words (remove propositions)	“of”, “to”, etc.	“”
Stop Words (remove conjunctions)	“and”, “or”, “nor”, etc.	“”

TABLE 1-continued

Canonicalization Type	Original Form	Canonical Form
Punctuation Removal	any character in the set: {<>[]{} _.\$%#!"?~* (unless these characters have meaning in and of themselves, such as "*" used to indicate a wildcard).	""
Replace with Whitespace	any character in the set: &,+=@/ ; or "/"	(space)
Multiple adjacent spaces	(space)(space). . .	(space)

Liu, Table 1, ¶0084.

A POSITA would have been motivated to combine Liu’s canonicalization with Wad’s query augmentation to improve the quality of the keywords used in Wad’s augmentation to identify user intent. EX-1010, ¶176. Both references teach analyzing queries and determining search keywords through analysis and correction of search terms. Wad recognizes that “[s]pelling mistakes and failure to group words into phrases” leads search engines to identify “records that are unrelated to the user’s intended query.” Wad, 1:27-29. Liu recognizes the same problem and discloses correcting misspellings and identifying phrases in query terms to streamline and simplify the “large number of possible keywords that a user might use.” Liu, ¶0013. Liu discloses additional techniques to refine the query with its teachings of canonicalization. A POSITA would have been motivated to supplement Wad’s

query refinement techniques with Liu's additional canonicalization techniques to refine the keywords identified in the query. This would have been the simple combination of known elements (Wad's correction of query spelling and grouping into phrases with Liu's additional identification of common entities, synonyms, variants of stems, and noisewords) to obtain a predictable result (improved query analysis and search accuracy). EX-1010, ¶¶176-177.

B. Claim 5

Wad-Steele in view of Liu discloses classifying the query by linguistic analysis of a query keyword. The '157 patent does not require any specific "linguistic analysis" or provide implementation details. '157 patent, 4:29-30, 9:53-55, 11:55-57, 16:65-67; EX-1010, ¶178.

Liu's "canonicalization," which transforms original forms of query terms into their canonical forms, is a form of linguistic analysis. *See* Liu, ¶¶0045, 0048; EX-1010, ¶179. The transformations include analyzing acronyms to determine underlying keywords; removing protocol words, articles, prepositions, or conjunctions; determining synonyms; or determining singular or plural forms of a term. Liu, ¶0048.

It would have been obvious to combine Liu with Wad-Steele to teach this element. *See* Section VI.A.

**VII. GROUND 3: WAD, STEELE, AND LOFTESNESS RENDER
OBVIOUS CLAIMS 6, 8-10**

A. Claim 6

Wad teaches claim 6. *See* Section V.E; EX-1010, ¶182.

Loftesness also teaches the additional limitation of claim 6 by describing using “user profile information” to classify a query into an intent. Loftesness, ¶¶0058-0059, *see also id.*, ¶¶0036, 0055-0056. In Loftesness, a user enters “identifying information (Email addresses, passwords, etc.)” to form idiosyncratic “user-specific classifications” and to classify a query on a “user-by-user basis.” *Id.*, ¶0058. For example, “a particular user may always purchase a particular type of jeans when she enters the query ‘hip hugger.’” *Id.*; EX-1010, ¶183.

As explained below in Section VII.B, it would have been obvious to combine Loftesness with Wad-Steele. Furthermore, a POSITA would have been motivated to combine Loftesness’s use of “user profile information” with Wad’s context builder to generate more accurate intent predictions for a user’s query. EX-1010, ¶185. Loftesness explains that user profile information allows for “user-specific classifications,” Loftesness, ¶0058, thereby allowing Wad’s context builder to better identify a user’s likely intent and to return more tailored search results. EX-1010, 185. Wad’s context builder already analyzes “previous queries executed by this user, age of this user, zip code of this user ... and user entered preferences such as

the number of results or display preferences.” Wad, 4:6-13; EX-1010, ¶162. Combining Loftesness with Wad-Steele would have been the simple combination of known elements to obtain a predictable result: Loftesness’s recording of profile information using a query transaction log incorporated into Wad’s context builder 210. EX-1010, ¶186.

B. Claim 8

Loftesness discloses using previously submitted queries from a subset of all users to classify a query. *See* Section VII.A. Loftesness “can consider the time at which actions occurred in performing its analysis” and can “apply weighting factors which attach greater significance to recent user behavior (compared to less recent behavior).” *Id.*, ¶0057. Loftesness tracks previous queries submitted by groups of users to aid in classifying future queries. Loftesness, ¶¶0035-0036, 0057-0059. These tracked queries “collectively reveal a pattern” that reflects “a common search strategy being applied by the users.” *Id.* The predicted intent is based on the “collective behavior of a population of users.” *Id.*, *see also id.*, Abstract, ¶¶0040-0041, 0096. Loftesness further performs an intent analysis on a “user-by-user basis, [or] a region-by-region basis.” Loftesness, ¶0058. Thus, Loftesness discloses classifying queries using previous queries submitted by a group or subset of all users. EX-1010, ¶187.

It would have been obvious to combine Wad-Steele and Loftesness. Wad and Loftesness employ strategies to determine a user intent. Wad recognizes that using “past queries and user context to form a resultant query that better reflects the intent of the query, [] can return more relevant results.” Wad, 1:38-43. Similarly, Loftesness teaches a data-mining operation that “involves identifying, for each user query, a pattern which evinces a predominate intent of the users in entering the query.” Loftesness, ¶0005. A POSITA would have been motivated to substitute Wad’s disclosure of using previous queries submitted by one user with Loftesness’s teaching of using previous queries submitted by a subset of all users to improve the accuracy of classifying the query. EX-1010, ¶188. Doing so would have been the simple combination of known elements to obtain a predictable result.

A POSITA would have been motivated to substitute Loftesness’s teaching for Wad’s because comparing query terms based on the “collective behavior of a population of users” would have been more accurate than examining a single user’s query in isolation, as Loftesness teaches. Loftesness, ¶¶0035-36; EX-1010, ¶188.

C. Claim 9

Wad teaches using click data from a previous user session to classify the query because Wad analyzes previous websites visited by the user, which would require clicks by the user to access those sites. EX-1010, ¶189. Wad explains that the content of a user’s previous website may inform the augmentation module when determining

a user's intent. Wad, 3:63-4:5. Tracking a user's activity across sites and queries includes tracking "click data." EX-1010, ¶189. Furthermore, a POSITA would have recognized Wad's using "previous queries executed by this user" would include activity from previous user sessions, including click data. Wad, 4:6-13.

Loftesness also discloses the features of claim 9. Loftesness discloses that "the logging module 126 *can record various actions taken by a user*, such as...*merely clicking on an item* to discover more information about an item, and so forth." Loftesness, ¶0052; EX-1010, ¶190.

A POSITA would have been motivated to combine Wad-Steele with Loftesness. *See* Section VII.B. Furthermore, a POSITA would have been motivated to combine Loftesness's logging of click data from previous user sessions with Wad's context builder to generate more accurate intent predictions for a user's query. EX-1010, ¶191. Loftesness explains that logging click data can help determine a nexus between a search result and a user's subsequent actions. Loftesness, ¶0052. Understanding a user's click data from previous searches would better inform Wad's context builder in determining a likely intent for the user's query. Wad's context builder already analyzes "previous queries executed by this user," and adding click data to the analysis of previous queries would validate the query history analyzed by Wad with click data affirming that a user intended a

certain result, as disclosed in Loftesness. Combining Loftesness with Wad-Steele would have been the simple combination of known elements to obtain a predictable result: Loftesness's recording of click data using logging module 126 incorporated into Wad's context builder 210. EX-1010, ¶191.

D. Claim 10

Loftesness teaches using click data from a subset of all users to classify the query. Loftesness discloses using previously submitted queries from multiple users to classify a query. *See* Sections VII.A, VII.B, and VII.C. Loftesness predicts an intent using the “collective behavior of a population of users who have previously entered this same query.” Loftesness, ¶0036. Part of this logged behavior includes click data. *See id.*, ¶¶0052, 0099. Loftesness correlates this click data with “user profile information” and allows subsequent query classification on a “user-by-user basis” or a “region-by-region basis.” *Id.*, ¶¶0058-0059; EX-1010, ¶¶192-193.

A POSITA would have been motivated to combine Wad-Steele with Loftesness. *See* Section VII.B. A POSITA would have been motivated to incorporate Loftesness's teachings of analyzing the collective behavior of a population of users and its teachings on the value of click data in determining user intent with Wad's context builder and intent recognizer to improve the accuracy of classifying the query from a single user as disclosed in Wad. EX-1010, ¶194. Doing so would have improved the accuracy of Wad's intent determination by incorporating the analysis

of collective user patterns and the analysis of the nexus of previous user click actions in determining the relevancy of results. *Id.*

VIII. GROUND 4: WAD, STEELE, AND LENNON RENDER OBVIOUS CLAIMS 12, 15-16, AND 19-23

A. Claim 12

Steele and Lennon teach the additional limitation of claim 12, including matching data objects to presentation rules and using the matching presentation rules to construct the at least one display entry. EX-1010, ¶196. The '157 patent explains that presentation rules map the intent of a query to presentation elements to customize the display of search results. '157 patent, 4:20-26, 4:36-40, 12:34-41. Presentation rules can be defined using an “XML schema.” *Id.*, 6:8-12.

Steele teaches extracting metadata from certain documents and building a visual document object model tree to structure the metadata for various document types in an index. *See* Steele, ¶¶0022-0024. The extracted metadata depends on the page type or classification tags assigned to the page, like price, product name, or images for a “product” page, or review summaries for a “reviews” page, which reflects a user’s intent. *Id.*, ¶¶0022-0024; EX-1010, ¶197.

Steele clusters the extracted metadata by each type of document, or intent, with a visual DOM (Document Object Model) tree. Steele, ¶0022. Steele further uses the extracted page metadata to customize the display of the ranked plurality of data

objects based on an assigned intent. *See* Sections V.B.9 and V.B.10. The intent-based tags and formatted metadata reside with the documents in the index. *Id.*, ¶¶0023-0024; EX-1010, ¶198.

To the extent that Steele does not expressly teach using a presentation rule associated with the data object to construct the at least one display entry, Lennon does. Lennon discloses presentation rules like the '157 patent, explaining that “presentation rules [] are typically targeted at element definitions as their associated actions specify how a particular descriptor type is to be presented in an application. A set of rules can be serialized in an XML document.” Lennon, ¶¶0079, 0316, 0370, 0395-0406; EX-1010, ¶199. The presentation rules “specify characteristics of the style of [a] generated presentation” of content. Lennon, ¶0026. The presentation rules “provide presentation behaviour for the instances of the descriptors defined in the description scheme.” *Id.*, ¶0399. More specifically, Lennon explains descriptors for content such as web pages include a “feature” value as well as a corresponding “representation value.” *Id.*, ¶¶0086-0089.

Example descriptors include:

- Feature = Author; Representation Value (string) = “John Smith”;
- Feature = DateCreated; Representation Value (date) = “1998-08-08”;
- Feature = Colour; Representation Value = ColourHistogramDescriptor.

Id. In this combination of Lennon with Wad-Steele, a POSITA would have known to assign “intent” as a “feature.” EX-1010, ¶199. Descriptors corresponding to the identified search results would include a “Feature” of “Intent” as well as a “Representation Value” corresponding to the particular intent assigned to the data object or search result. Lennon, ¶¶0086-0087, 0089.

Under Lennon’s teachings, presentation rules would then be applied to these descriptors to indicate how to generate and display the retrieved web results. *See id.*, ¶¶0370, 0395-0406; EX-1010, ¶200. The presentation rules “specify characteristics of the style of [a] generated presentation.” Lennon, ¶0026. The presentation rules “provide presentation behavior for the instances of the descriptors defined in the description scheme,” and allow applications to “define presentation rules based on individual descriptors in descriptions.” *Id.*, ¶0399. Under Lennon’s conditional presentation rules, the display functionality described in Steele would be applied to the particular resource when the resource has the matching assigned intent.

Lennon also describes an “action element” corresponding to a particular display action. *Id.*, ¶0400. The action element may relate to a particular function for displaying the search results based on the identified descriptor. *Id.*, ¶¶0370, 0400. Lennon’s examples of functions include “assign[ing] icons to descriptors” and selection rules for interactivity with the presentation “so the application can

differentiate visually between selected and non-selected descriptors.” *Id.*, ¶¶0370, 0395-0406. In this way, Lennon describes displaying items corresponding to different descriptors of a resource. *See, id.*, ¶¶0009-0012, 0025-0027; EX-1010, ¶201.

A POSITA would have been motivated to combine Steele’s intent-based customization of data entry display with Lennon’s presentation rules because Lennon’s XML data structures would have provided a useful format for Steele’s DOM tree to assign different display rules based on the assigned intents to the data objects. EX-1010, ¶202. Lennon explains that presentation rules, “can be serialised in an XML document.” Lennon, ¶0370. A POSITA would have applied Lennon’s well-known XML framework and presentation rules to provide a mechanism for organizing the classification tags and metadata stored in the index 212 of Steele that is used to generate Steele’s intent-based presentations. EX-1010, ¶202.

XML was well known, and using XML to define presentation parameters would have amounted to applying a known technique to Wad and Steele. Furthermore, a POSITA would have known how to combine Wad and Steele with Lennon and would have expected success in forming the combination. EX-1010, ¶203. The combination would apply Lennon’s formatting and presentation rules to generate a structure for displaying results based on the “classification tags”

described in Steele, which are “stored along with the copies of the documents in an index 212.” *See* Steele, ¶0023. Such a combination would have been the simple combination of known elements to obtain a predictable result. Furthermore, a POSITA would have expected the combination to work as intended because XML was a well-known language for specifying web resources when the ’157 patent was filed.

B. Claim 15

The ’157 patent explains that a presentation rule can be defined schematically as follows:

```
<rule pattern= “object matching pattern”>
  <intent type=“intent matching pattern”>
    <attribute rule>...</attribute rule>
    <attribute rule>...</attribute rule>
    ...
  </intent>
  <intent type=“intent matching pattern”>
    <attribute rule>...</attribute rule>
    <attribute rule>...</attribute rule>
    ...
  </intent>
  ...
</rule>
```

’157 patent, 4:40-55. An “object matching pattern” can “be used to match the rule to URLs in search results.” *Id.*, 4:56-58. Attribute rules can be used to enhance the display and functionality of search result pages. *Id.*, 5:11-52; EX-1010, ¶204.

Lennon discloses code examples that include the same rule pattern and attribute rules:

```
<Rule pattern = "VideoClipDescription/scene/Shot">  
  <Action> etc. . . </Action>  
</Rule>
```

```
<Rule pattern = "KeyFrame/Object[OnlyOfType()]">  
  <Action> etc. . . </Action>  
</Rule>
```

Id., ¶¶0365-0383; EX-1010, ¶205.

Lennon's "rule pattern" discloses the "object matching pattern." Lennon explains that resources may be identified using a "URI." *See* Lennon, ¶¶0150, 0208, 0331. EX-1010, ¶206. In this example, the URI or location entry would be the entry in the "Rule pattern" sample code provided above. Lennon, ¶¶0372, 0378. This URI is applied to a "Rule pattern" as described in Lennon to disclose the claimed "object matching pattern." A POSITA would have found it obvious to implement a URL in this way to identify a web page. *Id.*, ¶¶0003, 0079, 0263; EX- 1010, ¶211.

Lennon's URI/URL entry also acts as the basis for matching the URI/URL "name" as recited in the claims and subsequently processing the associated attribute rules of the presentation. *See id.*, ¶0021 ("descriptor component in the descriptions of the set of descriptions matches the predetermined pattern"), ¶0407("a check is made whether a pattern associated with the selected rule can be found"), *see also id.*, ¶¶0150, 0208, 0331, 0375; EX-1010, ¶207.

Lennon, in defining different rule patterns for different descriptions, discloses the object matching pattern which is applicable and used to refine the presentation rules described in Lennon. *See* Lennon, ¶¶0160, 0365, 0371-0372; EX-1010, ¶208; Section VIII.A.

Lennon also discloses attribute patterns and attribute values which disclose the claimed “intent matching pattern.”

ElementPattern	::= ElementTypePattern ElementQualification
ElementTypePattern	::= OneElementTypePattern '*'
OneElementTypePattern	::= ElementTypeName
ElementQualification	::= '[' Qualifiers? ']'
Qualifiers	::= Qualifier (',' Qualifier)*
Qualifier	::= ChildQualifier AttributeQualifier PositionalQualifier
AttributeQualifier	::= AttributePattern ('=' AttributeValue)?
AttributePattern	::= 'attribute' '(' AttributeName ')'
AttributeValue	::= '""' ['^' '*' '*' '*'] ['^' '*' '*'] '""'
PositionalQualifier	::= Position '(' ' ')'
Position	::= 'FirstOfType' 'NotFirstOfType' 'FirstOfAny' 'NotFirstOfAny' 'LastOfType' 'NotLastOfType' 'LastOfAny' 'NotLastOfAny' 'OnlyOfType' 'NotOnlyOfType' 'OnlyOfAny' 'NotOnlyOfAny'

Lennon, ¶0374; EX-1010, ¶209.

Wad-Steele and Lennon further describe the attribute rules associated with an intent matching pattern. For example, Lennon describes a hierarchy of descriptors and rule patterns. *See id.*, ¶¶0375, 0021. In view of this description, Lennon describes a sub-attribute that may also apply as a rule. EX-1010, ¶210. The combination of Wad-Steele with Lennon would apply Lennon’s “pattern hierarchy”

of descriptors within the presentation rule to apply sub-attributes or sub- elements, such as intent-based attribute rules. Lennon, ¶¶0021, 0375. This would allow Steele to store rules for displaying certain metadata based on the data object’s classified intent, and the assigned “intent” would be the attribute pattern. Steele, ¶¶0023, 0024, 0027.

A POSITA would have understood that when implementing the intent-based presentation described in Steele, object-based and intent-based rules such as those described in Lennon would also be used. *See* Section VIII.A; EX-1010, ¶211. For example, when building the visual DOM tree and generating the structure for document metadata in Steele, a POSITA would have known to implement a “pattern hierarchy” such as the one described in Lennon when displaying this metadata in Steele’s presentation. Steele ¶0022, Lennon, ¶0375. This combination would apply the same “rule pattern” described in Lennon and the ’157 patent to teach the claimed “object matching pattern.” EX-1010, ¶210. A POSITA would have then defined another rule for the “intent matching pattern” to achieve the intent-based results described in Steele. *Id.* An intent matching pattern would be defined using the general “attribute patterns” described in Lennon. *Id.* As explained above in Section VIII.A, a POSITA would have known that “intent” is a “feature” of a data object’s description. *Id.*, ¶216-217. In applying the presentation rules described in this

combination, the rule would check to determine that a rule pattern corresponding to the name of a resource matches and would check that an intent also matches. *Id.* Like the '157 patent, Lennon discloses that resources may be identified using a "URI." *See* Lennon, ¶¶0150, 0208, 0331; '157 patent, 5:37- 39, 11:14-16, 12:48-50. By matching the descriptor using the URI, Lennon discloses identifying a match with the object matching pattern like the '157 patent. Lennon, ¶¶0021, 0375, 0407. Thus, the combination of Wad-Steele with Lennon discloses matching the intent matching pattern based on an attribute string corresponding to an identified intent. Based on these matching values, the claimed display entries are constructed using the presentation rules. *See* Section VIII.A. Thus, Lennon in view of Wad-Steele renders claim 15 obvious. A POSITA would have been motivated to combine the references, would have known how to combine the references, and would have expected the combination to operate successfully for the reasons explained above in Section VIII.A; EX-1010, ¶211- 212.

C. Claim 16

Lennon describes the application of multiple rule sets to a particular resource to construct a display entry: "if more than one rule set is specified then it is assumed that both rule sets can be applied...the individual rule sets are simply combined and treated as a single rule set." Lennon, ¶0386. Lennon further describes iterating through multiple presentation rules so that all applicable presentation rules are

processed. *Id.*, ¶¶0406-0407, Fig. 13. In this manner, Lennon describes multiple presentation rules which may be applied to present the resource. *Id.*; Ex-1010, ¶213.

Thus, Lennon in view of Wad-Steele renders claim 16 obvious. A POSITA would have been motivated to combine the references, would have known how to combine the references, and would have expected the combination to operate successfully for the reasons explained above in Section VIII.A; EX-1010, ¶214.

D. Claim 19

Steele discloses assigning at least two intents to a data object. *See* Steele, ¶¶0021, 0024 (“As will be appreciated by those skilled in the art, a variety of intent-based tags and formatted metadata may reside along with the documents in the index 212.”)

Wad-Steele further discloses determining a user’s most likely intent from a plurality of intents. *See* Section V.B.5.

Lennon discloses presentation rules to modify the display of data objects. *See* Section VIII.A.

It would have been obvious for a POSITA to select the intent most likely corresponding to the user query to choose between multiple presentation rules to apply to the respective data object. EX-1010, ¶¶215-218. A POSITA would have been motivated to make such a combination because it would resolve a conflict

between the display of multiple presentation rules when a data object has multiple intents as disclosed by Steele. EX-1010, ¶¶214.

E. Claim 20

Lennon discloses applying a “most specific order first” for multiple presentation rules based on its “tree-based processing model.” Lennon, ¶¶0154-0156, 0160, 0440-0442; EX-1010, ¶219.

Lennon’s tree structure first begins with a “root” that “specif[ies] the resource to which the description refers.” Lennon, ¶0155, *see also id.*, ¶¶0154-0155, 0160. A presentation rule applied to this root discloses the “most specific order first” because the root specifies the particular resource being displayed. *Id.*, ¶0155. Subsequently, other leaf nodes are processed. *Id.*, ¶¶0154, 0156. In the XML document defining the presentation rules, “the content of an element is represented as child nodes of the element.” *Id.*, ¶0156. To the extent Lennon does not explicitly disclose this limitation, it would have been obvious to modify the presentation rules of Lennon, as implemented in Wad-Steel, to process the presentation rules in the “most specific order first.” EX-1010, ¶222. When examining a rule set for a resource, Lennon discloses that “[r]esolution of rules is performed on the basis of rule order” and is serialized. Lennon, ¶¶0396-0398. Lennon further discloses that the set of rules “can be serialised (stored) in an XML document.” *Id.*, ¶0386. A POSITA would have understood that these rules could be serialized in order of the most specific rules first

and would have been motivated to do so to further customize the display by presenting the display according to the specific content desired. EX-1010, ¶222. These serialized rules would then be applied to a resource as described above with reference to claim 15. *See* Section VIII.B; EX- 1010, ¶225-226.

F. Claim 21

Lennon describes applying multiple presentation rules according to a rule precedence order. *See* Section VIII.E. Lennon describes presentation rule sets for a particular resource. When resolving a rule set, “resolution of rules is performed on the basis of rule order,” which is serialized. Lennon, ¶¶0386, 0397-0398. The “set of rules that is applicable for a given description scheme can be serialised (stored) in an XML document.” *Id.*, ¶0386. Additionally, Lennon discloses applying two rule sets in combination “in which the order of rules to be processed is provided by the order of the listing of the individual rule sets and the order of the individual rules within each given rule set.” *Id.*; EX-1010, ¶¶223-224. A POSITA would have been motivated to combine the references, would have known how to combine the references, and would have expected the combination to operate successfully for the reasons explained above in Section VIII.A

G. Claim 22

Wad-Steele and Lennon discloses this element. *See* Section VIII.A.

H. Claim 23

Wad-Steele and Lennon discloses this element. *See* Section VIII.B.

IX. GROUND 5: WAD, STEELE, LENNON, AND MOORE RENDER OBVIOUS CLAIMS 13-14 AND 17-18

A. Claim 13

The '157 patent describes a feed as an XML-based file that maps a presentation rule to a URL or URI. '157 patent, 6:7-9, 12:48-56.

Steele discloses receiving data from merchants or third parties associated with certain data objects through a feed. Steele teaches feeds when it describes “two sources of information, a web crawler 202 and content feeds 204.” Steele, ¶0020. Steele’s feeds receive information from third parties, like merchants. *Id.* Steele explains that feeds are well-known and that many techniques exist for a party to communicate their content in a feed. *Id.*; EX-1010, ¶229.

To the extent Steele does not expressly disclose receiving presentation rules via a feed, Lennon does. Lennon describes a data structure for receiving presentation rules through the same configuration as the '157 patent and teaches an XML file containing URI descriptors and presentation rules. Lennon, ¶¶0150, 0208, 0331, 0370, 0395-0406. Lennon also describes separately “specifying the XML document containing the presentation rule set” from the content itself. *Id.*, ¶0398. Lennon therefore supplies the presentation rules via a feed. EX-1010, ¶230.

Moore also explicitly describes “RSS data feeds” which provide presentation rules. Moore, ¶¶0102, 0115, 0138, 0167. Moore states that “RSS data feed 202 may be presented to a client 102 as an RSS file (in XML format).” *Id.*, ¶0138. Additionally, “tags from an RSS feed can be used to feed a template, such as an XML-enabled template.” *Id.*, ¶0167. An “RSS-enabled server” may provide an RSS feed using “XML grammar” to provide a “title and description of items to be syndicated.” *Id.*, ¶0115; EX-1010, ¶231.

It would have been obvious to combine Moore’s teaching of RSS data feeds and Lennon’s teaching of presentation rules with Wad-Steele. Steele admits a “variety of techniques exist in the art for a party to communicate their content in a feed of structured data,” Steele, ¶0020, and Moore’s RSS data feeds are one such example. EX-1010, ¶232.

Combining Moore with Wad-Steele, and Lennon would simply be combining prior art elements to yield predictable results. A POSITA would have applied Moore’s well-known feed management techniques to increase security and aid a user when evaluating search results to improve the combination of Wad- Steele and Lennon. EX-1010, ¶233. For example, Moore describes RSS feed functionality as well as the management of trusted and untrusted feed sources. *See* Moore, ¶¶0198, 0292, 0295, 0301, and 0304. A POSITA would have been motivated to combine

Moore with Wad, Steele, and Lennon to provide data streams to a user and to manage trusted and untrusted sources for additional security.

Furthermore, a POSITA would have known how to combine Moore with Wad-Steele and Lennon. EX-1010, ¶234. Steele already discloses feeds, and Moore merely identifies specific types of feeds. A POSITA would have known how to implement the same feed and XML-based functionality described in Moore with the XML framework described in Lennon.

B. Claim 14

Lennon and Moore teach this limitation. Lennon explains presentation rules are typically stored as part of a resource's description scheme which may be an "XML document containing the presentation rule set." Lennon, ¶0398; EX-1010, ¶236.

Moore explains that a "Web document" can be written using XML. Moore, ¶0113. "[S]emantic content of an item, including the body and metadata" may be used to generate a display. *Id.*, ¶¶0160, *see also id.*, ¶¶0044, 0114, 0157. A user interface "interprets semantic content to determine one or more display characteristics." *Id.*, ¶0157. Moore therefore describes content within a web page defining display parameters, i.e., presentation rules embedded in a data object. EX-1010, ¶237.

A POSITA would have been motivated to combine Wad-Steele Lennon, and Moore with a reasonable expectation of success. *See* Section IX.A.

C. Claim 17

Lennon describes the resolution of presentation rules “performed on the basis of rule order.” Lennon, ¶0398. Lennon applies multiple rule sets “by the order of the listing of the individual rule sets and the order of the individual rules within each given rule set.” *Id.*

To the extent that Lennon does not expressly disclose presentation rules originating from trusted and untrusted feeds, Moore does. Moore describes presentation rules received via an “aggregation of one or more data feeds” which “may specify one or more display parameters.” Moore, ¶0039. Moore also describes displaying trusted and untrusted feeds and may “visually distinguish between these feeds.” *Id.*, ¶¶0198, 0301, 0304. A “user certificate” may be used to determine whether a source is trusted or untrusted. *Id.*, ¶0292. Moore also describes “ranking, selecting, or filtering feeds and/or posts” based on trustworthiness. *Id.*, ¶0295. Further, Moore ranks trusted feeds and posts using presentation rules. *Id.*, ¶¶0198, 0295; EX-1010, ¶¶239-240.

A POSITA would have been motivated to combine Wad-Steele Lennon, and Moore with a reasonable expectation of success. *See* Section IX.A.

D. Claim 18

Lennon discloses applying multiple presentation rules based on a rules-based order, with at least one rule originating from a trusted feed. *See* Sections VIII.C and IX.C. Lennon and Moore also disclose identifying a presentation rule embedded in a data object. *See* Section IX.B. A POSITA would have understood these disclosures to teach a data object matching at least two presentation rules, at least one from a trusted feed and at least one embedded in a data object. EX-1010, ¶239.

A POSITA would have found it obvious to prioritize a presentation rule originating from a trusted feed in a situation where the resource itself may be provided by an untrusted feed. This would provide additional security and prioritize secure feeds as described in Moore. Moore, ¶0301; EX-1010, ¶¶242-243.

X. THE BOARD SHOULD INSTITUTE *INTER PARTES* REVIEW

The Director's interim procedure states that institution will not be denied based on the *Fintiv* factors "where a petition presents compelling evidence of unpatentability." Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation at 2 (USPTO June 21, 2022). The *Fintiv* factors need not be applied here because the petition presents a compelling case that all claims are unpatentable.

Even if *Fintiv* were applied, all factors favor institution or are neutral. Factor 1 is neutral because neither party has requested a stay. *See, e.g., Sand Revolution II, LLC v. Continental Intermodal Grp.-Trucking LLC*, IPR2019-01393, Paper 24 at 7

(P.T.A.B. June 16, 2020) (informative). Factor 2 weighs against discretionary denial because no trial date is scheduled in either R2’s suit against Petitioner American Airlines, Inc. (“American Airlines Litigation”) or R2’s suit against Petitioner Hilton Domestic Operating Company, Inc. (“Hilton Litigation”).⁶ EX-1012, 4.

Factor 3 favors institution because the parties have expended limited resources in the litigations and Petitioners acted expeditiously—*i.e.*, by filing the Petition within two months of the answer being filed in the Hilton Litigation and before the parties’ *Markman* hearing, in the early stages of fact discovery, and before expert discovery in the American Airlines Litigation. EX-1012, 1-2; *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 16-17 (P.T.A.B. Dec. 1, 2020) (precedential). Factor 4 favors institution because Petitioners challenge all claims of the ’157 patent, although Patent Owner asserts a subset in the litigation. EX-1014, at 2 (“Claims 1-2, 6, 11-14, 16 and 22”); EX-1018, 23 (“Claims 1-5 and 7-10”). Petitioners also stipulate that, if the Petition is instituted, Petitioners will not pursue the grounds identified in this Petition in litigation. *Sand Revolution*, Paper 24 at 11-12. Factor 5 favors institution because Patent Owner has asserted the ’157 patent in at least 18 different litigations since January 2021, involving different defendants. EX-1015, 1-2. Given Patent Owner’s pattern of early settlement (with

⁶ A scheduling order has not yet been entered in the Hilton Litigation.

over 11 defendants so far), and the patent's term extending to June 2030 ('157 patent, Cover), Patent Owner's campaign is likely to continue. Institution will promote judicial efficiency and integrity by reducing the number of issues to be addressed in numerous parallel litigations. Factor 6 favors institution because Petitioners have set forth a strong case of unpatentability. *Sand Revolution*, Paper 24 at 13.

XI. MANDATORY NOTICES

A. Real Party in Interest

The real party-in-interest for Petitioners is American Airlines Inc. and Hilton Domestic Operating Company, Inc. No unnamed entity is funding, controlling, or otherwise has an opportunity to control or direct this Petition or Petitioners' participation in any resulting IPR.

B. Related Matters

To the best knowledge of Petitioner, the '157 patent is or has been involved in the following district court and PTAB matters:

Name	No.	Court	Filed	Status
<i>R2 Solutions LLC v. 7-Eleven, Inc.</i>	3-22-cv-02868	N.D. Tex.	12/21/2022	Pending
<i>R2 Solutions LLC v. Southwest Airlines Co.</i>	3-22-cv-02869	N.D. Tex.	12/21/2022	Pending

Name	No.	Court	Filed	Status
<i>R2 Solutions LLC v. GameStop Corp et al</i>	3-22-cv-02870	N.D. Tex.	12/21/2022	Pending
<i>R2 Solutions LLC v. Hilton Domestic Operating Company Inc.</i>	3-22-cv-02761	N.D. Tex.	12/12/2022	Pending
<i>FedEx Corporate Services, Inc. v. R2 Solutions LLC</i>	IPR2022-01456	PTAB	8/25/2022	Closed
<i>Allegiant Travel Company v. R2 Solutions LLC</i>	2-22-cv-00828	D. Nev	5/24/2022	Pending
<i>R2 Solutions LLC v. American Airlines, Inc.</i>	4-22-cv-00353	E.D. Tex.	4/28/2022	Pending
<i>R2 Solutions LLC v. CVS Health Corporation et al</i>	4-22-cv-00354	E.D. Tex.	4/28/2022	Closed
<i>R2 Solutions LLC v. Hilton Worldwide Holdings Inc. et al</i>	4-22-cv-00356	E.D. Tex.	4/28/2022	Closed
<i>R2 Solutions LLC v. Citigroup Technology, Inc.</i>	4-22-cv-00357	E.D. Tex.	4/28/2022	Closed
<i>R2 Solutions LLC v. FedEx Corporate Services, Inc.</i>	4-21-cv-00940	E.D. Tex.	11/29/2021	Closed
<i>R2 Solutions LLC v. Booking.com BV</i>	4-21-cv-00942	E.D. Tex.	11/29/2021	Closed
<i>R2 Solutions LLC v. Booking.com Transport Limited</i>	4-21-cv-00943	E.D. Tex.	11/29/2021	Closed
<i>R2 Solutions LLC v. Agoda Company Pte. Ltd.</i>	4-21-cv-00944	E.D. Tex.	11/29/2021	Closed

Name	No.	Court	Filed	Status
<i>R2 Solutions LLC v. Redfin Corporation</i>	4-21-cv-00945	E.D. Tex.	11/29/2021	Closed
<i>Roku, Inc. v. R2 Solutions LLC</i>	IPR2021-01582	PTAB	10/4/2021	Closed
<i>Roku, Inc. v. R2 Solutions LLC</i>	IPR2021-01583	PTAB	10/4/2021	Closed
<i>R2 Solutions LLC v. Expedia Group, Inc.</i>	6-21-cv-00628	W.D. Tex.	6/17/2021	Closed
<i>R2 Solutions LLC v. iHeartMedia, Inc.</i>	6-21-cv-00552	W.D. Tex.	6/1/2021	Closed
<i>R2 Solutions LLC v. Roku, Inc.</i>	6-21-cv-00553	W.D. Tex.	6/1/2021	Closed
<i>R2 Solutions LLC v. Deezer SA</i>	4-21-cv-00090	E.D. Tex.	1/29/2021	Closed
<i>R2 Solutions LLC v. Walmart Inc.</i>	4-21-cv-00091	E.D. Tex.	1/29/2021	Closed
<i>R2 Solutions LLC v. Target Corporation</i>	4-21-cv-00092	E.D. Tex.	1/29/2021	Closed
<i>R2 Solutions LLC v. Workday, Inc.</i>	4-21-cv-00093	E.D. Tex.	1/29/2021	Closed

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D. Service Information

Petitioners request that all non-electronic correspondence be directed to lead counsel and back-up counsel as shown above. Petitioners consents to electronic service by email.

E. Payment of Fees

The Office is authorized to charge the fees specified by 37 C.F.R. §§ 42.103(a) and 42.15(a) to Deposit Account No. 50-5723.

XII. GROUNDS FOR STANDING (37 C.F.R. § 42.104(A))

Petitioners certify that the '157 Patent is available for *inter partes* review, and that Petitioners are not barred or estopped from requesting an *inter partes* review challenging the claims on the grounds identified in this Petition. Petitioners filed this Petition within one year of service of the original complaints against Petitioners.

XIII. CONCLUSION

Petitioners request the Board institute review and cancel the challenged claims as unpatentable.

Dated: March 6, 2023

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(a)(i), the undersigned certifies that this Paper—exclusive of the table of contents, table of authorities, grounds for standing under § 42.104, mandatory notices under § 42.8, certificate of service, and this certificate of word count—includes 13,950 words.

/ John Campbell/
John Campbell (Reg. No. 54,665)

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105(a), the undersigned certifies that on March 6, 2023, a complete copy of this Petition for Inter Partes Review, Petitioners' power of attorney, and all exhibits were served on Patent Owner at the correspondence addresses of record listed below by FedEx Priority Overnight® to:

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A courtesy copy is also being sent via FedEx Priority Overnight® to litigation counsel at:

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