

# EXHIBIT 7

PUBLIC VERSION

**IN THE UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF VIRGINIA**

I/P ENGINE, INC.,

Plaintiff,

v.

AOL, INC., GOOGLE INC., IAC SEARCH &  
MEDIA, INC., TARGET CORP., and  
GANNETT CO., INC.

Defendants.

C.A. No. 2:11-cv-512-RAJ

**JURY TRIAL DEMANDED**

**REPORT OF DEFENDANTS' EXPERT  
LYLE H. UNGAR, PH.D., CONCERNING  
"NEW ADWORDS" FUNCTIONALITY**

**CONFIDENTIAL – OUTSIDE COUNSEL ONLY**

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## **I. BACKGROUND & QUALIFICATIONS**

1. My name is Lyle H. Ungar. I have been retained by Defendants AOL, Inc., Google Inc., IAC Search & Media, Inc., Target Corp., and Gannett Co., Inc. (collectively “Defendants”) to give my expert opinion as to whether the AdWords system in use today (“New AdWords”) presents more than a colorable difference than the previously adjudicated version of AdWords (“Old AdWords”). I also have been asked to respond to the allegations and opinions contained in the Report of Ophir Frieder, dated September 25, 2013 (the “Frieder Report”).

2. I receive \$600 per hour for my work. My compensation is not dependent upon the outcome of this case.

3. My qualifications are listed in Section II and Exhibit C of my July 25, 2012 Report.

4. It may be necessary for me to supplement this report based on material that subsequently comes to light in this case, and I reserve the right to do so. I may be asked to present demonstrative evidence, and I reserve the right to do so.

5. It may be necessary for me to revise or supplement this report, or submit a supplemental or responsive report, based on any evidence Plaintiff I/P Engine, Inc. (“I/P Engine”) may present, or on any supplemental or responsive report of I/P Engine, and I reserve the right to do so.

## **II. LEGAL STANDARD**

6. I understand that “in determining whether more than colorable differences are present the court focuses on those elements of the adjudged infringing products that the patentee previously contended, and proved, satisfy specific limitations of the asserted claims.” *nCUBE Corp. v. SeaChange Int’l Inc.*, 2013-1066 at 6-7 (Fed. Cir. Oct. 10, 2013) (internal quotation marks omitted). Specifically,

Where one or more of those elements previously found to infringe has been modified, or removed, the court must make an inquiry into whether that

modification is significant. If those differences between the old and new elements are significant, the newly accused product as a whole shall be deemed more than colorably different from the adjudged infringing one, and the inquiry into whether the newly accused product actually infringes is irrelevant.

*Id.* at 7.

7. I further understand that when there are significant differences between a feature that was previously adjudicated to infringe and a new feature—including both the composition of the feature and whether those features perform distinct functions—then the new feature is likely to be found more than colorably different from the old feature. *Id.* at 9.

8. I further understand that “the colorable-differences standard focuses on how the patentee in fact proved infringement, not what the claims require.” *Id.* at 10. “Instead of focusing solely on infringement, the contempt analysis must focus initially on the differences between the features relied upon to establish infringement and the modified features of the newly accused products.” *TiVo Inc. v. EchoStar Corp.*, 646 F. 3d 869, 882 (Fed. Cir. 2011).

9. Additionally, “[t]he court must also look to the relevant prior art, if any is available, to determine if the modification merely employs or combines elements already known in the prior art in a manner that would have been obvious to a person of ordinary skill in the art at the time the modification was made. A nonobvious modification may well result in a finding of more than a colorable difference.” *Id.* at 882-83.

### **III. THE ASSERTED CLAIMS**

10. I/P Engine asserted that Old AdWords infringed claims 10, 14, 15, 25, 27, and 28 of U.S. Patent No. 6,314,420 (the “’420 Patent”) and claims 1, 5, 6, 21, 22, 26, 28, and 38 of U.S. Patent No. 6,775,664 (the “’664 Patent”). Claims 10 and 25 of the ’420 Patent are independent, as are claims 1 and 26 of the ’664 Patent.

11. I have included the text of the independent claims below. Of note, all four independent claims require filtering “each informon”<sup>1</sup> or filtering “combined information.”

**A. Asserted Independent Claims of the '420 Patent**

**10.** A search engine system comprising:<sup>2</sup>

- a) a system for scanning a network to make a demand search for informons relevant to a query from an individual user;
- b) a content-based filter system for receiving the informons from the scanning system and for filtering the informons on the basis of applicable content profile data for relevance to the query; and
- c) a feedback system for receiving collaborative feedback data from system users relative to informons considered by such users;
- d) the filter system combining pertaining feedback data from the feedback system with the content profile data **in filtering each informon** for relevance to the query.

**25.** A method for operating a search engine system comprising:

- a) scanning a network to make a demand search for informons relevant to a query from an individual user;
- b) receiving the informons in a content-based filter system from the scanning system and filtering the informons on the basis of applicable content profile data for relevance to the query;
- c) receiving collaborative feedback data from system users relative to informons considered by such users; and
- d) combining pertaining feedback data with the content profile data **in filtering each informon** for relevance to the query.

**B. Asserted Independent Claims of the '664 Patent**

**1.** A search system comprising:

- a) a scanning system for searching for information relevant to a query associated with a first user in a plurality or users;
- b) a feedback system for receiving information found to be relevant to the query by other users; and
- c1) a content-based filter system for combining the information from the feedback system with the information from the scanning system and

<sup>1</sup> The Court found that an informon is “information entity of potential or actual interest to the [individual/first] user.” (June 15, 2012 Claim Construction Order at 8.)

<sup>2</sup> The letter designations are added for clarity.

c2) for **filtering the combined information** for relevance to at least one of the query and the first user.

26. A method for obtaining information relevant to a first user comprising:

- a) searching for information relevant to a query associated with a first user in a plurality of users;
- b) receiving information found to be relevant to the query by other users;
- c) combining the information found to be relevant to the query by other users with the searched information; and
- d) content-based **filtering the combined information** for relevance to at least one of the query and the first user.

12. As discussed in Section V, *infra*, the steps I/P Engine accused of meeting the “filtering” limitations have been entirely removed from New AdWords.

#### IV. **THE ACCUSED ADWORDS SERVICE**

##### A. **Overview**

13. Google AdWords or simply “AdWords” is Google’s online search- and content-based advertisement system. Google ads may be displayed on Google’s search results page or on the search results for partner web sites, such as the New York Times. (Trial Tr. 1089:25-1090:3; 1033:15-1034:2.) When appearing on Google.com, ads can appear in the “top slot” above the search results or on the right hand side (“RHS”) of the search results. (Trial Tr. 1098:1-17.) Additionally, if there are three or fewer ads that would appear on the RHS, those ads may appear below the search results. (Furrow Dep. 21:14-22, Sept. 20, 2013.)

The screenshot shows a Google search for "norfolk furniture stores". The search bar at the top contains the text "norfolk furniture stores" and a search button. Below the search bar are tabs for "Web", "Images", "Maps", "Shopping", "More", and "Search tools". The "Web" tab is selected.

On the left side, under the heading "Top Ads", there is a red arrow pointing to a box containing several ads related to "norfolk furniture stores". The ads include:

- High-End Furniture Stores - yellowpages.com**: Create Your Dream Home W/ High-End Quality Furniture. Find Stores Now!
- Exotic Home Interiors - ExoticHomeInteriors.com**: Custom Furniture For Your Entire Home At Affordable Prices. About Us - Reclaimed Furniture - Design Center - Contact Us. 819 Granby Street, Norfolk, VA - (757) 625-7292
- Beach Cottage Furniture - JossAndMain.com**: Join Joss & Main For Free & Gain Access to Daily Curated Sales! Joss & Main has 403 followers on Google+ Free Membership, Join Now - Plume Magazine
- Norfolk Furniture Stores. Living Room Furniture | Havertys**: At Havertys Norfolk, livable style and lasting quality come together to make furniture built for life. We offer over 100 store locations throughout the Southeast.
- Decorum Furniture**: 301 W 21st St Norfolk (757) 623-3100
- Grand Furniture!**: 836 E Little Creek Rd Norfolk (757) 588-4334

On the right side, under the heading "RHS Ads", there is a green arrow pointing to a box containing several ads related to "norfolk furniture stores". The ads include:

- Ashley® Furniture Store**: The New Hindell Park Collection. Discover What's New at Ashley. 5144 Virginia Beach Blvd (757) 499-4041
- Norfolk Furniture**: Find Casual, Modern & Classic Furniture at Macy's - Top Quality! 880 N. Military Highway, Norfolk, VA (757) 461-2911
- Havertys Furniture**: Find Your Style At Havertys.

Between the two ad boxes is a map titled "Map for norfolk furniture stores" showing the locations of the stores in Norfolk, VA. The map includes labels for "Norfolk Botanical Garden", "Bayville Farms Park", "Northwest", and "Norfolk".

Figure 1: Google.com search results page for “Norfolk furniture stores”

14. Google ads appear on a third-party search results page through the “AdSense for Search” (AFS) program. (Trial Tr. 1033:15-1034:2.)



The New York Times **Search** Most Popular Searches ▼

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Your Search   Images (BETA)

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**Date Range**

All Since 1851

Past 24 Hours

Past 7 Days

Past 30 Days

Past 12 Months

Specific Dates

Sort by: [Newest](#) | [Oldest](#) | **Relevance**

1-10 of about 3,850,000 Results

**Sponsored Links**

[Summer Games 2012 Online | TelevisionFanatic.com](#)  
Watch All Summer Games Online. Download Toolbar - Completely Free!  
[www.televisionfanatic.com/](#)

[Summer Games Online - Watch 2012 Summer Games For Free.](#)  
Download Toolbar - No Registration!  
[www.bringmesports.com/](#)  
Watch Live Sports Sports News  
Watch Highlights Watch Live Football

**Sponsored Links**

[Official Team USA Store](#)  
Visit TeamUSAShop.com for Official 2012 Team USA Olympian Gear.  
[www.teamusashop.com/](#)  
Team USA Jerseys

[Go For Gold & Win Money](#)  
Win \$5,000 A Week For Life! Free Entry at PCH.com As Seen On TV  
[www.pch.com/GoForGold](#)

[The Olympics](#)  
Get The Olympics Find The Olympics  
[www.ask.com/The+Olympics](#)

**Result Type**

All

Articles

NYTimes.com Section: **2012 London Olympics**

The latest updates from top athletes and news organizations covering the Summer Games.

Figure 2: NYTimes.com search results page for “Olympics.”

15. Broadly speaking, advertisers submit their advertisements to Google using an advertising front-end system. (Trial Tr. 1041:6-20.) One such system can be found at [adwords.google.com](#):

Google AdWords Help Sign out

---

Home Campaigns Opportunities Tools and Analysis ▼ Billing ▼ My account ▼

---

Customize modules Last 7 days  
Jul 29, 2012 - Aug 4, 2012 ▼

▲ All campaigns ▼ Primary metric Clicks ▼ Compare to Nothing ▼

Clicks	Impr.	CTR	Avg. CPC	Cost
0	0	0.00%	\$0.00	\$0.00

▲ Alerts and announcements (2)

▲ Ads disapproved (5) [Dismiss](#)

▲ Your account isn't active because you haven't entered your billing information. [Dismiss](#)

[View alerts »](#) 1-2 of 2

📈 Performance graph

▲ Good quality but low traffic keywords (34)

Keyword	Clicks	Cost	CTR	Impr.	Avg. CPC
web hosting domain	0	\$0.00	0.00%	0	\$0.00

▲ Keywords below first page bid (0)

No matching keywords.

Figure 3: Dashboard page for [adwords.google.com](#)

16. In addition to the text of the advertisement itself, an advertiser enters keywords, a destination URL, and the maximum amount the advertiser is willing to pay if a user actually clicks on the advertisement. (Trial Tr. 1041:16-1042:5.) This latter amount is termed the “maximum cost per click” or “Max CPC,” and functions as the advertiser’s bid for the ad to be displayed on a Google and/or third-party partner property. (Trial Tr. 1041:2-5.)

17. Google uses an auction mechanism to calculate which ads to show, what order to show them in, and how much to charge each advertiser. (Trial Tr. 1042:6-11; *see also Bid for Position, LLC v. AOL, LLC*, 601 F.3d 1311, 1312 (Fed. Cir. 2010).) Google computes predicted clickthrough rates (“pCTRs”) for each ad for each auction. (Trial Tr. 1042:9-19.) The pCTR is combined with an LQ (“landing page quality”) score, a CQ (“creative quality”) score, and the Maximum CPC to generate a Long-Term Value (“LTV”) score used for ranking and pricing. (Trial Tr. 1460:23-1461:12.)

18. In the Old AdWords system, Google computed up to two LTV scores for each ad for each query: a “top” LTV score which was used with the auction for the positions in the top slot (above the search results), and a “Right Hand Side” or “RHS” LTV score which was used with the auction for the positions in the right hand side slot. (Trial Tr. 1098:1-17; 1101:7-18; 1104:25-1105:15.) Ads were ordered by their top and RHS LTV scores within the top and right-side side slots, respectively. (Trial Tr. 1101:7-18; 1104:25-1105:15.) Thus, the ad with the highest LTV score for a given slot was in the first position for that slot, followed by the ad with the next-highest LTV score, and so on. (Trial Tr. 1102:14-1103:4.) In New AdWords, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] The specifics and consequences

of [REDACTED] are discussed more fully in Section V, *infra*.

19. After the auction is completed, Google calculates the price a winning advertiser might pay. Advertisers are generally charged on a cost per-click or “CPC” basis: if the ad is not clicked on, then Google does not receive any money. (Trial Tr. 1040:22-1041:5.) The cost per click or “Actual CPC” is a function of the *next-best* advertiser’s LTV score as well as the ad’s own runtime pCTR, LQ, and CQ scores. (Trial Tr. 1101:10-1103:20.)

20. It is worth noting that I/P Engine did not assert that using LTV scores to order ads, determine the winner, and compute the winner’s price infringed the asserted patents. In other words, the auction method itself was not accused. (Frieder Depo. 40:16 to 41:20.) Rather, I/P Engine accused the use of pCTRs and/or LTV scores to filter advertisements before the auction, and thus prevent them from participating in the auction. (*Id.*) I/P Engine identified three functionalities as allegedly performing this pre-auction “filtering” step: “QBB disabling,” “Mixer disabling,” and “Promotion thresholding.” (Trial Tr. 1015:23-1016:8.) As discussed in Section V below, [REDACTED]

#### **B. The Accused Quality-Based Bidding Disabling (QBB Disabling) Feature**

21. In addition to computing runtime pCTRs for inclusion in LTV scores, Old AdWords also computed a static pCTR for each ad prior to any query being received. (Trial Tr. 1252:2-20.) Old AdWords used this static pCTR to set a reserve price or “Minimum CPC” for each ad as it was entered into the system, prior to any auction. For example, an ad with a high static pCTR might have had a \$0.02 Min CPC, while an ad with a low static pCTR might have had a \$1.00 Min CPC. Advertisements that did not meet their minimum bids were disqualified from all auctions. (*Id.*) By disqualifying numerous low quality ads from competing in the

auction, Old AdWords reduced the number of ads in each auction and thus the computation time associated with each auction. I/P Engine asserted that since QBB disabling considered pCTR in deciding whether to disqualify an ad, it met the “filtering” limitation required by the asserted claims. (Trial Tr. 494:8-495:7; 1015:23-1016:8.) As detailed, below, [REDACTED]

**C. The Accused Mixer Disabling Feature**

22. “Mixer disabling” referred to a prior runtime feature which disqualified additional advertisements from an auction. As discussed above, Old AdWords computed a right-hand side Long-Term Value (“RHS LTV”) score for a given auction, which was a function of Max CPC, pCTR, LQ, and CQ scores. (Trial Tr. 1101:19-25.) Ads whose RHS LTV scores were less than zero were disqualified from participating in the right-hand-side auction. (Trial Tr. 1102: 13-1103:4; 1104:25-1105:10.) By disqualifying ads with a negative RHS LTV from the right-hand-side auction, Old AdWords reduced the computational time associated with that auction. (Trial Tr. 1067:24-1069:14; 1127:19-1131:7; 1994:1-22.) I/P Engine asserted that since Mixer disabling used pCTR as one of the components in computing the RHS LTV score, and since ads with RHS LTV scores less than zero were disqualified from the right-hand-side auction, that met the “filtering” limitation required by the asserted claims. (Trial Tr. 495:20-496:8; 1015:23-1016:8.) As detailed below, [REDACTED]

**D. The Accused Promotion Thresholding Feature**

23. Within the Google.com search results, ads may appear on top of, to the right of or below the search results. Ads that appeared above the search results were considered “promoted” with respect to the “normal” ads on the right hand side. (Trial Tr. 1046:13-19.) Old AdWords computed a top LTV score, which was a function of Max CPC, pCTR, LQ, and CQ scores. (Alferness Dep. at 130:20-131:17, June 21, 2012 (played into the trial record, *see* Case

Clip(s) Detailed Report, at 13-14)). Ads that had a negative top LTV score were disqualified from participating in the top auction. (Trial Tr. 1102: 13-1103:4.) By disqualifying ads with a negative top LTV score from the top auction, Old AdWords reduced the computational time associated with that auction. (Trial Tr. 1067:24-1069:14; 1127:19-1131:7; 1994:1-22.) I/P Engine asserted that since Promotion thresholding used pCTR as one of the components in computing the top LTV score, and since ads with top LTV scores less than zero were disqualified from the top auction, that met the “filtering” limitation required by the asserted claims. (Trial Tr. 496:13-25; 1015:23-1016:8.) As detailed below, [REDACTED]

**E. I/P Engine’s Focus on Pre-Auction Accused “Filtering” Steps at Trial**

24. At trial, I/P Engine repeatedly stressed the technical importance of filtering ads from participating in the *auction* through the accused QBB disabling, Mixer disabling, and Promotion thresholding steps. According to I/P Engine, these “filtering” steps solved Google’s “10 billion ads” problem, in that Google had 10 billion ads in its databases but supposedly could not send all 10 billion ads to the auction. (Trial Tr. 1994:1-3 (“Let’s remember, on a big picture level, Google told you that it had 10 billion ads in its inventory. That’s too much information.”)) I/P Engine made a point of this claimed benefit in its cross-examination of Google engineer Bartholomew Furrow:

Q. Google can’t send all billion to the *auction* and return the ads in the time required for a user to get its search results, can’t it?

A. I don’t think we’ve ever tried it.

Q. You know of no fact at Google where that would be possible, do you?

A. No what?

Q. No facts, you’re aware of no facts or experiment to Google where it would be possible to send 10 million [sic] ads to the *auction* and return in the time frame, I believe, of 10 milliseconds, was the testimony given by Mr. Alferness?

A. That's correct, as far as more, there has been no attempt to do that.

Q. So you have to disable; isn't that right? Let me ask you different. You do disable?

A. Yes.

(Trial Tr. 1127:21-1128:11.) As is clear from this exchange, I/P Engine was stressing the importance of filtering of ads before the auction.

25. I/P Engine's cross-examination of Google engineer Jonathan Alferness placed similar emphasis on filtering pre-auction:

Q. All right. And the problem is with 10 billion ads and only a few that you are going to put on the page, you have to take away a lot of ads, don't you, a lot of bad ads?

A. Again, it's our job to find the 11 best, most useful ads to show to our users.

Q. And you have to take them away because the computers that Google has are not able to actually analyze all of those ads in the context of a particular query, are they?

A. There are some keywords for which we have many, many, many ads, and in those cases they can be a burden on our overall system so we do find ways to reduce the complexity in those cases.

Q: Right. In fact, you testified that because of latency and overall overhead constraints you couldn't take all the eligible or candidate ads for an auction and bring them into the mixer points; isn't that right?

(Trial Tr. 1067:24-1068:12.)

26. The deposition clips I/P Engine chose to play to the jury similarly emphasized the importance of reducing the number of ads considered by the auction. For example, I/P Engine played the following excerpt from Mr. Alferness's deposition:

Q. I would like you to look at Alferness Exhibit 1 and in particular the page bearing Bates stamp 03 G-IPE-0223570.

A. Okay. I'm there.

Q. Okay. Do you see the heading "Disabling (QBB, LPQ, and Min CPC)"?

A. I do.

Q. Is disabling -- what is disabling?

A. Disabling, as we talk about somewhat broadly in AdWords, is the process or the mechanisms that we use to select which ads we do not want to show or produce on our search results pages for our end users.

Q. It says: The first round of disabling, sometimes called shard disabling, takes away bad ads before they reach the ad mixer. What does "takes away bad ads" mean, if you know?

THE WITNESS: In this case, I would say "takes away bad ads" is a synonym for disabling, right. We are -- for a number of reasons at this time, we wanted to make sure the ad mixer itself could only handle so many creatives, keywords, ads, if you want to think of it like that, in the auction. Various just latency and overall I would say overhead constraints meant that we couldn't take all of the eligible or candidate ads for an auction and bring them all into the mixer at once. So in this case, what we're saying is there is some amount of disabling -- i.e., removal of lower quality ads, *to help with the overhead of when things reach the ad mixer.*

(Alferness Depo at 54:1-55:5 (emphasis added), *played at* Trial Tr. 356:10-15, 747:19-25.)

27. I/P Engine also played the following excerpt from the deposition of Derek Cook, the Google engineer primarily responsible for QBB disabling, concerning his proposal to eliminate QBB disabling:

Q. And was this proposal adopted?

A. No, it was not.

Q. Do you have an understanding of why it wasn't adopted?

A. I made inaccurate estimates in my ability to reduce latencies by other mechanisms outside of QBB. It's a machine issue.

Q. So does that mean -- so QBB is -- in the bigger system is still essential to the latency issue; is that what you're saying?

A. As of right now we cannot remove QBB minCPCs because we do not have enough machines to handle scoring all the ads in our system.

(Cook Depo at 131:18 to 132:05, *played at* Trial Tr. 748:12-749:19.)

28. Notably, however, Mr. Alferness also testified that sending these 10 billion ads to the auction would soon no longer be the technical problem that it once was:

Q. Is it your view that Google cannot bring all 10 billion ads into the auction because of machine and overhead constraints?

A. Actually, not anymore. We are working on changes to our system now whereby we will no longer need to limit the number of ads that we look at for these purposes. It was the case previously.

(Trial Tr. 1069:8-14.) Mr. Alferness' testimony on this point presages the New AdWords system. [REDACTED]

[REDACTED] This New AdWords system is described below.

## V. NEW ADWORDS

### A. Overview

29. Google first began work on an overhaul to its auction system in April 2011.<sup>3</sup> As discussed above, Old AdWords computed a top LTV score for each available advertisement for a given query and selected up to three ads to appear above the search results. (Furrow Dep. 20:4-15, Sept. 20, 2013.) Old AdWords then computed a right-hand-side or "RHS" LTV score for each remaining advertisement for a given query, and selected up to eight ads to appear to the right of the search results. (Furrow Dep. 20:16-21:22, Sept. 20, 2013.) Critically, these LTV scores were computed in a vacuum: because *all* of the top LTV scores were computed at once, those scores could not account for the impact of other advertisements on that page. Similarly, because *all* of the RHS LTV scores were computed at once, those scores could not account for the impact of other winning RHS ads.

30. [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

---

<sup>3</sup> Note that this predates the instant litigation, which was filed on September 15, 2011.



Ad related to **vegas** ⓘ

**VEGAS.com™ Official Site**  
[www.vegas.com/](http://www.vegas.com/) ▼  
Book **Vegas** Hotels, Shows & More at the Official **Vegas** Travel Site™.  
VEGAS.com has 474 followers on Google+

<b><u>Las Vegas Air + Hotel</u></b> Choose From 400 Airlines from 1,700 Departure Cities Plus Hotels	<b><u>Las Vegas Deals</u></b> Check Out the Latest <b>Vegas</b> Hotel and Show Deals Only at <b>VEGAS.com™</b>
<b><u>Las Vegas Hotels</u></b> Save Up to 50% Now on <b>Vegas</b> Hotel Rooms only at <b>VEGAS.com™</b>	<b><u>Headliners and Concerts</u></b> Celine, Terry Fator, Human Nature Donny and Marie, Rock Vault

**Figure 4: A large ad appearing on a query for “vegas”.**  
Note the “sub-ads” for sections of the website and the count of Google+ followers

Ads related to **vegas vacation** ⓘ

**Vegas Vacation Packages - Specials on Packages, Hotel + Air**  
[www.tripadvisor.com/LasVegas](http://www.tripadvisor.com/LasVegas) ▼  
★★★★★ 32 reviews for tripadvisor.com  
Check Rates, Compare & Read Reviews  
TripAdvisor has 1,572,365 followers on Google+

**Vegas Vacation Packages - Up to \$75 Off Pkgs at MGM Resorts**  
[www.southwestvacations.com/Las-Vegas](http://www.southwestvacations.com/Las-Vegas) ▼  
Limited Time Only - Book Today.  
SW Vacations Promo Codes - Great Vegas Deals - Mexico and the Caribbean

**Vegas Vacation Packages - Expedia.com**  
[www.expedia.com/Las\\_Vegas\\_Packages](http://www.expedia.com/Las_Vegas_Packages) ▼ ★★★★★ 27,121 seller reviews  
Great Deals on **Vacation** Packages. Book Your Next **Vacation** to **Vegas**.  
Expedia has 1,705,262 followers on Google+  
Cheap Packages - Last Minute Deals - Discount Vacations - Best Price Guarantee

**Figure 5: Enhanced ads appearing on a query for “vegas vacation”.** Note that enhanced ads contain a review score, the number of followers, and/or direct links to sections of the site.

[REDACTED]

31. In order to compute the long term value of the entire page of ads, Google needed to

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

34. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] The

QBB pCTR was thus a coarse means of estimating the clickability of the advertisement *in general*, with a quality measurement that was significantly less precise than a runtime pCTR. However, disabling ads based on this static pCTR reduced the load each auction imposed on Google's servers, since those servers did not need to compute pCTRs or LTV scores for each ad or rank large subsets of ads. (Furrow Dep. 65:18-25, Sept. 20, 2013.)

[REDACTED]

35. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

36. Dr. Frieder does not dispute that [REDACTED]

[REDACTED] Nor does Dr. Frieder contend that [REDACTED] results in no more than a colorable variation from the prior system that [REDACTED].<sup>6</sup>

C. [REDACTED]

37. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

---

<sup>6</sup> Note that even Dr. Frieder's assertion of colorable variation contains an significant caveat: "[w]ith respect to the filtering steps associated with the auction." (Frieder 5.) Dr. Frieder does not make any claims regarding "filtering" steps not associated with the auction—*i.e.*, QBB disabling—nor does Dr. Frieder make any claims regarding the many other relevant changes made to New AdWords.

[REDACTED]

[REDACTED]

38. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

D. [REDACTED]

39. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

40. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

VI. NEW ADWORDS IS NOT JUST A COLORABLE VARIATION FROM OLD ADWORDS; IT IS SIGNIFICANTLY DIFFERENT

41. As discussed above, [REDACTED]

[REDACTED] Rather than  
conducting a single auction for each “slot” of ads, Google now [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

42. Google began working on this system overhaul in April 2011, before this litigation even began. Thus, this overhaul was not *prompted* by this litigation. However, one *consequence* of this overhaul is that the disabling steps that I/P Engine accused of meeting the “filtering” limitations of the claims were [REDACTED] See Sections V.B through V.D, *supra*. These accused “filtering” steps simply do not make business sense in [REDACTED] New AdWords conducts. This is because New AdWords has

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



query-independent pCTR scores, it was a very crude process. It disabled ads across-the-board, without considering how relevant these ads might be in *particular* auctions for *particular* queries. [REDACTED]

[REDACTED] Thus, for example, an ad that would perform well in response to an idiosyncratic query will not be disabled across-the-board just because it would not perform well for *most* queries. For example, an ad for the esoteric chemical ionomycin, sold to biomedical researchers by chemical supply companies, would be sent to the auction for an “ionomycin” query. Under Old AdWords, by contrast, such an ad might get disabled across-the-board by QBB disabling and barred from participating in *any* auctions, even for the “ionomycin” query for which it was well-qualified.

46. As noted previously, I/P Engine argued at trial that the accused “filtering” steps in Old AdWords – including QBB disabling – were critical to the operation of the accused system because they solved the supposed problem of Google being unable to send all 10 billion ads to the auction. (Trial Tr. 1067:24-1068:12; 1127:21-1128:11; 1994:1-3.) [REDACTED]

[REDACTED] This basic and substantial difference between Old AdWords and New AdWords—done for business reasons independent of this litigation—renders the two systems far more than colorably different.

47. Of note, Dr. Frieder does not contend that New AdWords contains *any* functionality that is equivalent to, or no more than colorably different than, [REDACTED]



██████████ As explained above, QBB disabling was a query-independent step that disabled ads from participating in all auctions based on their “static” pCTRs; *i.e.*, their perceived “clickability” independent of any query. I/P Engine’s infringement case at trial focused significantly on the use of QBB disabling. Not only was QBB disabling one of the three steps accused of “filtering,” but I/P Engine played into the record large excerpts of deposition testimony from Google Engineer Derek Cook discussing QBB disabling and only QBB disabling. (*See* Cook Dep. 126:07-137:17) (played into record at trial). Thus, Google’s use of QBB disabling *per se* formed a major part of I/P Engine’s infringement case, and ██████████ is accordingly highly relevant in determining whether the difference is a mere colorable variation. It is not.

**B. ██████████ Further Renders New AdWords More Than Colorably Different From Old AdWords**

48. Rather than discussing QBB disabling, Dr. Frieder focuses his opinions on ██████████ Mixer disabling and Promotion thresholding steps. Again, ██████████ alone renders New AdWords more than a colorable variation of Old AdWords. But ██████████ Mixer disabling and Promotion thresholding also renders New AdWords far more than a colorable variation of Old AdWords.

49. Like QBB disabling, Mixer disabling and Promotion thresholding were designed to disqualify ads before they could enter the auction. Again, I/P Engine alleged that these alleged “filtering” steps were critical to the operation of Old AdWords because Google was unable to run an auction with all 10 billion ads. (Trial Tr. 1067:24-1068:12; 1127:21-1128:11; 1994:1-3.) But New AdWords ██████████

██

██

██

[REDACTED]

[REDACTED]

[REDACTED] In other words, the old Mixer disabling and Promotion thresholding steps simply do not make sense with, and are incompatible with, the New AdWords system. [REDACTED]

[REDACTED] showing that New AdWords is far more than colorably different from Old AdWords. In fact, the alleged efficiency benefits of reducing ads that are eligible from the auction through Mixer and Promotion disabling are [REDACTED]

50. In fact, even Dr. Frieder acknowledges that [REDACTED]

[REDACTED]

asserting that “[t]he timing of the step is inconsequential and appears to be the result of doing auctions [REDACTED]” (Frieder ¶ 18.) But Dr. Frieder’s own statement is internally inconsistent: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Thus if the timing of a step is necessary to effectuate an outcome, and if that outcome has vast consequences for a service’s available features, then that timing can hardly be deemed “inconsequential.”

51. Dr. Frieder alleges that New AdWords is no more than colorably different from Old AdWords system because New AdWords still [REDACTED]

[REDACTED] as Mixer disabling and Promotion thresholding did. (See Frieder Report ¶ 7

[REDACTED] None-the-less, Google still filters ads to ensure a standard. As discussed below, that filtering step is the same

LTV filtering step used in Mixer Disabling and Promotion.”)) (internal citations omitted<sup>9</sup>); ¶ 11 (“[b]oth systems filter/filtered candidate advertisements from being shown to a user by comparing the candidate advertisement’s LTV score to a zero threshold and do not show the candidate advertisement if the LTV score is below zero.”)

52. I disagree with Dr. Frieder’s assessment, because the process by which New AdWords [REDACTED] – what Dr. Frieder points to as the supposed mere colorable variation from Mixer disabling and Promotion thresholding in Old AdWords – is very different from Mixer disabling and Promotion thresholding. Dr. Frieder reduces these processes to the notion of “not showing ads whose LTV scores fall below zero,” and concludes that the processes are no more than colorably different on that basis. But Dr. Frieder’s intentionally one-dimensional analysis ignores important differences between [REDACTED] [REDACTED] on the one hand and the Mixer disabling and Promotion thresholding in Old AdWords on the other.

53. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

---

<sup>9</sup> Dr. Frieder cites to portions of Mr. Furrow’s deposition for support of his statement that “Google still filters ads to ensure a standard.” I have reviewed the portions of cited testimony, and nowhere does Mr. Furrow agree that that New AdWords filters ads.

<sup>10</sup> As discussed in Section VII, *infra*, [REDACTED]

[REDACTED]

54. Dr. Frieder concedes that this difference exists between Old AdWords and New AdWords. [REDACTED]

[REDACTED] Nonetheless, Dr. Frieder contends that this difference is immaterial. (*Id.*) I disagree: [REDACTED] [REDACTED] is materially very different from the pre-auction disqualification that Old AdWords performed through Mixer disabling and Promotion thresholding.

55. First, the comparisons in New AdWords and Old AdWords are not designed to solve the same problems. As previously discussed, the comparison of each and every ad in Old AdWords' Mixer disabling and Promotion thresholding steps ensured that the auction would not be overloaded with too many ads. By contrast, New AdWords [REDACTED]

[REDACTED] In other words, an ad failing the accused "filtering" steps in Old AdWords is merely disqualified from the corresponding auction, while [REDACTED]

[REDACTED] These vastly different consequences show that the two systems are far more than colorably different.

56. In addition, Mixer disabling and Promotion thresholding in Old AdWords compared each and every candidate ad one-by-one to zero, and then disabled any ad that failed to meet this threshold. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

In other words, Old AdWords compared *every ad in the auction* – thousands or millions of ads overall – to zero for disabling purposes.<sup>12</sup> [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

57. The distinction between performing an item-by-item comparison of each ad to zero on the one hand, and [REDACTED]

[REDACTED] is particularly salient given I/P Engine’s own theories in this case. In order to distinguish the prior art Bowman patent, I/P Engine’s validity expert Dr. Carbonell asserted that “filtering [] does not use a ranked list, but rather is an item-by-item process” (Carbonell Report ¶ 90). Dr. Carbonell similarly testified at trial that “filtering is done with a fixed criterion, a criterion that does not depend on the other items, and it does the processing one at a time *without comparing one item to another.*” (Trial Tr. 1847:1-9.) Dr. Carbonell then testified that the Bowman reference does not engage in filtering because

[REDACTED]

[REDACTED]

It actually made this comparison *twice* for each ad: once for the top slot, and once for the right hand side slot.

Bowman's thresholding process first requires ranking the search results relative to each other. (Trial Tr. 1852:11-20; Carbonell Report ¶ 90 ("Subsetting' as disclosed in Bowman is retaining a subset of a ranked list either by thresholding on ranking values or retaining the top 'N' results. Bowman 9:58-64. *These techniques are relative and carried out with reference to the entire ranked list of search results. The use of these techniques is different than filtering, which does not use a ranked list, but rather is an item-by-item process.*") (emphasis added)). But as I/P Engine characterized Bowman, New AdWords [REDACTED]

[REDACTED] And Dr. Frieder takes this position even though, at trial, he never accused the auction of infringement, let alone [REDACTED]

**C. New AdWords Does Not Perform the Equivalent of the Accused "Filtering" Steps in Old AdWords**

58. Paragraphs 14-17 of Dr. Frieder's report assert that New AdWords and Old AdWords perform substantially the same function in substantially the same way to achieve substantially the same result. I disagree: none of the three prongs of the function-way-result test is substantially the same in New AdWords as compared to Old AdWords.

59. In terms of "function," the function of the Mixer disabling and Promotion steps in Old AdWords was to prevent ads from participating in the auction. But the function of [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Thus, the accused technology in the two systems have different functions.

60. In terms of “way,” I discussed above how New AdWords and Old AdWords function in very different ways under I/P Engine’s own theories of the case. The Mixer disabling and Promotion thresholding in Old AdWords subjected every ad to a non-relative process in which each ad was compared one-at-a-time to a threshold to determine whether it was eligible for the auction. New AdWords [REDACTED]  
[REDACTED] Thus, the accused technology in the two systems operate in different ways.

61. And in terms of “result,” the result of Mixer Disabling and Promotion in Old AdWords was to reduce the number of ads in the auction, thereby sparing computing power. By contrast, the result of [REDACTED]  
[REDACTED] Thus, the accused technology in the two systems achieve different results.

62. Dr. Frieder’s application of the function-way-result test to the accused technology in Old AdWords and New AdWords contains several analytical errors. Initially, Dr. Frieder makes no analysis that accounts for [REDACTED] But this change alone shows that this function-way-result test cannot be met, particularly when one considers [REDACTED]  
[REDACTED]

[REDACTED] In any event, even [REDACTED] as Dr. Frieder improperly does, the function-way-result test is not met.

63. In terms of “function,” Dr. Frieder asserts that the function of the accused technology in both Old AdWords and New AdWords is to “[f]ilter out low quality ads.” (Frieder Report ¶¶ 15-16.) [REDACTED]  
[REDACTED]  
[REDACTED] See

Section VII, *infra*.

64. In terms of “way,” Dr. Frieder asserts that the accused technology in both Old AdWords and New AdWords “[f]ilter based on LTV score (which includes pCTR) in the AdMixer, by comparing a candidate’s LTV score to zero.” (Frieder Report, ¶¶ 15-16.) But this is incorrect, as New AdWords [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

65. In terms of “result,” Dr. Frieder asserts that the accused technology in both Old AdWords and New AdWords “[p]resent only advertisements that meet Google’s ‘standard’ in terms of being shown to the end user.” (Frieder Report ¶¶ 15-16.) Here Dr. Frieder improperly shifts from narrowly comparing the accused disabling steps on Old AdWords [REDACTED]

[REDACTED] and instead examines the two systems *as a whole*. While both Old AdWords and New AdWords *generally* seek to present high-quality ads to the end user, that is not the specific result of the accused disabling steps in Old AdWords or [REDACTED]

New AdWords.<sup>13</sup> The specific result that Mixer disabling and Promotion thresholding achieved was to reduce the number of ads in the auction, thereby sparing computing power. By contrast, the specific result of [REDACTED]

[REDACTED]

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<sup>13</sup> By reducing the “result” prong to one (and only one) consequence of the entire process, Dr. Frieder essentially posits that *any* processes in the same field achieve the same “result,” no matter how dissimilar they are. For example, any two ice cream-making processes would be deemed to have the same “result,” no matter how dissimilar they are, as long as they both produced high-quality ice cream. Any two shoe-making processes would be deemed to have the same “result,” no matter how dissimilar they are, as long as they both produced high-quality shoes. This logic would make the “result” prong all but meaningless.



**D. Google's Marketing Documents Are Not Appropriate For a Technical Analysis**

66. Paragraph 19 of Dr. Frieder's report asserts that because the documents on Google's website "do not describe any change in the AdWords system with regard to eligibility," "it is apparent that any changes to advertisement quality filtering were not substantial enough to change how the process is described to Google's advertising customers." Under Dr. Frieder's reasoning, a car manufacturer's new cost-cutting and/or quality assurance initiatives should not be deemed substantial unless they are described in detail on that company's web site. This position assumes that companies regularly and *publicly* describe the inner workings of their manufacturing or service delivery processes, and is contrary to common business sense.

67. As I noted in an earlier report, Google's marketing documents were not meant to be an authoritative technical resource regarding the functionality of the accused products and are "not a true mathematical formula" for how the ad system operates. (*See* Alferness Depo. at 102:9-12, *played at* Trial Tr. 356:10-15, 747:19-25.) They were simply meant to give advertisers a "high-level feel." (*Id.*; *see also* Trial Tr. 1081:7-1082:7 ("We are trying to explain things to our advertisers in a way such that they understand how to operate within the system. We are talking about tens if not hundreds of thousands of advertisers, lay people here. We are not prescribing in technical detail how the system works.").) Moreover, the cited marketing documents do not even *mention* the accused QBB disabling, Mixer disabling, and Promotion thresholding steps. It is odd to insist that marketing documents should have trumpeted [REDACTED] that they never previously mentioned. In any event, the marketing docs themselves state that "[b]ecause our Help Center isn't written for computer science engineers, *these articles shouldn't be used to understand the technical details of any particular component of our systems.*" (G-IPE-0892436 (emphasis added); *see also* <https://support.google.com/adwords/answer/3094231?hl=en>.)

## VII. NEW ADWORDS DOES NOT INFRINGE ANY ASSERTED CLAIMS

68. Dr. Frieder asserts that “[a]ny difference between Old AdWords and New AdWords with respect to filtering is not relevant *to the infringed claims*. For example, the claims do not require a specific timing relative to the AdWords auction.” (Frieder Report ¶ 13) (emphasis added). But all asserted claims do require *filtering*, and New AdWords does not perform filtering. Accordingly, New AdWords does not infringe any asserted claim.

69. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

70. It is especially clear that New AdWords does not perform “filtering” when one considers I/P Engine’s litigation theories in this case. For example, the validity report of I/P Engine’s expert Dr. Carbonell asserted that “filtering [] does not use a ranked list, but rather is an item-by-item process.” (Carbonell Report ¶ 90.) Likewise, Dr. Carbonell testified at trial that filtering is a “one by one” or “one at a time” process in which each candidate item is serially compared to a standard to determine whether it should be kept or discarded. (Trial Tr. 1847:1-9).

71. Under I/P Engine’s own standards—made for the express purpose of distinguishing prior art based on the “filtering” limitation—New AdWords clearly does not engage in filtering. For example, New AdWords [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

72. Moreover, [REDACTED]

[REDACTED] Yet Dr. Carbonell testified that filtering *cannot* involve comparing one item to another. (Trial Tr. 1847:1-9 (“So filtering is done with a fixed criterion, a criterion that does not depend on the other items, and it does the processing one at a time *without comparing one item to another.*”)) Likewise, Dr. Carbonell testified that the Bowman prior art reference does not engage in filtering, even though Bowman discards search results that fail to meet a threshold, because Bowman’s thresholding process first requires ranking the search results relative to each other. (Trial Tr. 1852:11-20; Carbonell Report ¶ 90 (“‘Subsetting’ as disclosed in Bowman is retaining a subset of a ranked list either by thresholding on ranking values or retaining the top ‘N’ results. Bowman 9:58-64. *These techniques are relative and carried out with reference to the entire ranked list of search results. The use of these techniques is different than filtering, which does not use a ranked list*, but rather is an item-by-item process.”) (emphasis added)). Because New AdWords requires [REDACTED] this process cannot be considered “filtering” under I/P Engine’s own theories of the case.

## **VIII. ANALYSIS OF COMPARABLE LICENSES**

### **A. The Disney Licenses**

73. The Disney License also includes patents which are technologically comparable to the patents asserted in this case. The Asserted Patents generally relate to narrowing search results based on the content of the results and feedback from other users with similar interests or needs. The patents included in the Disney license also relate to narrowing and ranking search results based on the content of a web page. For example, U.S. Patent Nos. 6,728,705 and 7,424,478 relate to category-based search functionality which is inherently content-based. U.S. Patent Nos. 5,983,216, 6,018,733, 5,659,732, 5,845,278, 5,920,854 and 6,070,158 relate to ranking and retrieving search results based on the number of times the words in the search query are found in the result. Thus, as argued by I/P Engine in this case, they would also relate to content-based analysis. Accordingly, the patents included in the Disney license are of similar subject matter as the patents asserted in this case.

### **B. Invenda License**

74. The patents licensed by Google from Invenda are also technologically comparable to the patents-at-issue. U.S. Patent Nos. 6,556,991 and 6,853,996 relate to improving search functionality. As argued by I/P Engine, the patents-at-issue also teach improving search functionality. U.S. Patent No. 6,556,991 to Borkovsky, “Item Name Normalization” explains that an “approach for processing search queries generally involves normalizing names and descriptions of items.” (’991 Patent, Abstract.) The ’991 patent further teaches “a method . . . for normalizing item names.” (*Id.*, 2:35-36.) Similarly, the ’996 patent to Chen et al., “Product Normalization” is also directed towards improving search functionality. The ’996 patent discloses:

A computer-implemented approach is provided for organizing input listings from various sources of input listings. Input listings are organized by mapping the input listings to consolidated listings. Various techniques are disclosed for mapping the

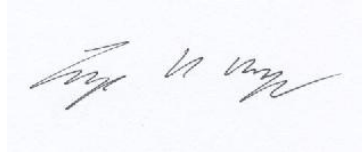
input listings to the consolidated listings, including a Product Code normalization technique, a name/title normalization technique, and a model normalization technique. Instead of presenting results to a search query for a product in a scattered fashion, consolidated listings, which are listings related to the same product, are presented in response to the search query. ('996 Patent, 2:24-35.)

75. Thus, like the patents-in-suit, the '991 and the '996 patents are also directed towards the subject matter of improving search functionality and are, therefore, technologically comparable. Moreover, as both patents discuss presenting results based on the search query or product name, like the patents-at-issue, the '991 and '996 patents are also both directed towards content-based search technology.

**C. Invenda Purchase**

76. The patent purchased by Google from Invenda, U.S. Patent No. 6,385,602 to Tso, "Presentation of Search Results Using Dynamic Categorization" is also technically comparable to the patents-at-issue. The '602 patent relates to improving search functionality and also relates to content-based searching. Specifically, the '602 patent states that "a method is provided for presenting search results using dynamic categorization. The method comprises the steps of receiving search results, dynamically establishing one or more search result categories based upon attributes of the search results and presenting one or more category identifiers corresponding to the one or more search result categories." ('602 Patent, 2:53-59.) As a part of the search, the patented system "filter[s] search results and generate[s] qualifying data items." ('602 Patent, Fig. 2.) Accordingly, as the patents-at-issue also relate to improving search functionality and content-based searching, the '602 patent is technologically comparable to the patents-at-issue.

Executed on October 15, 2013 at Philadelphia, PA.



A handwritten signature in black ink, appearing to read "Jay W. Unger", is centered on the page. Below the signature is a horizontal line.

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