

# EXHIBIT 8

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UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA

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	)
MATTHEW CAMPBELL, MICHAEL	)
HURLEY, and DAVID SHADPOUR, on	)
behalf of themselves and all	)
others similarly situated,	)
	)
Plaintiffs,	)
	)
vs.	) Case No.
	) C 13-05996 PJH
	)
FACEBOOK, INC.,	)
	)
Defendant.	)

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VIDEOTAPED DEPOSITION OF RAY HE  
Palo Alto, California  
Friday, September 25, 2015  
Volume I

Reported by:  
CHRIS TE SELLE  
CSR No. 10836  
Job No. 2144894  
  
PAGES 1 - 273

<p>1 BY MR. CARNEY: 10:59:59                  2 Q. Okay. And then if we look at the next                  3 line, which begins, share select, underscore, count,                  4 do you see that?                  5 A. Yes. Select share_count. 11:00:10                  6 Q. Okay. And what did you mean by the term,                  7 select share_count?                  8 A. It is a FQL query.                  9 Q. And what information is it querying?                  10 A. The field share_count. 11:00:34                  11 Q. What information is contained in the field                  12 share_count?                  13 MR. CHORBA: Objection. Vague.                  14 THE WITNESS: I would have to review the code                  15 to know exactly. 11:00:53                  16 MR. CHORBA: Also, belated objection. Vague as                  17 to time, as well.                  18 BY MR. CARNEY:                  19 Q. What's your best understanding of what it                  20 means, without access to the entire Facebook source 11:01:07                  21 code?                  22 MR. CHORBA: Same objections.                  23 THE WITNESS: I think this would actually                  24 depend on when -- so, the query there, you are not                  25 actually able to make, depending on the time in 11:01:25                  Page 74</p>	<p>1 tables, so I meant table in the sense of SQL table; 11:03:00                  2 in this case, FQL table.                  3 Q. And is a particular table being queried                  4 by, for example, the share_count?                  5 A. Is -- 11:03:20                  6 MR. CHORBA: Objection. Vague as to time.                  7 BY MR. CARNEY:                  8 Q. Between 2009 and 2012.                  9 A. Can you describe what you mean by, is it                  10 queried. Oh. Who would be doing the querying, and 11:03:28                  11 in what time.                  12 Q. A Facebook employee, between 2009 and                  13 2012.                  14 A. There have been Facebook employees who                  15 have queried the table. 11:03:49                  16 Q. Okay. Are there third parties that can                  17 query the table -- let me, between, were there third                  18 parties who could query the table using those                  19 commands between 2009 and 2012?                  20 A. Not these commands, exactly. 11:04:07                  21 Q. Similar commands that pulled the same                  22 information?                  23 A. Yes. Well, not the same information.                  24 Q. Could, could third parties pull the                  25 share_count between 2009 and 2012? 11:04:39                  Page 76</p>
<p>1 question. Like, we never, we never launched the 11:01:30                  2 ability to select all those things.                  3 BY MR. CARNEY:                  4 Q. Did you launch the ability to select any                  5 of those things, beginning with the select 11:01:40                  6 share_count?                  7 A. I believe we did have a share_count, a                  8 like_count, and a comment_count.                  9 Q. Okay. And so --                  10 A. I'm not sure about those counts. 11:01:57                  11 Q. How about the URL from share_stats? What                  12 did you mean when you wrote those words?                  13 A. URL is a field in the table, the FQL                  14 table. However, the table was not ultimately named                  15 share_stats, so I think this is like a sample query, 11:02:14                  16 not what we actually checked in.                  17 Q. What do you mean by the term, checked in?                  18 A. What was committed to the code base, and                  19 what eventually was placed on the site.                  20 Q. You mentioned the term, table, a moment 11:02:44                  21 ago.                  22 What did you mean by, table?                  23 A. So, as I explained, the Facebook query                  24 language is a SQL like language for querying the                  25 Facebook API, and one concept of SQL is the idea of 11:02:57                  Page 75</p>	<p>1 MR. CHORBA: Objection. Vague as to 11:04:44                  2 share_count.                  3 THE WITNESS: Depends on what you mean by                  4 share_count.                  5 BY MR. CARNEY: 11:04:48                  6 Q. What did you mean by share_count when you                  7 used that term in this e-mail?                  8 A. I couldn't, I don't remember what I meant,                  9 because share_count means two different things.                  10 Q. Okay. What are the two things share_count 11:05:01                  11 means?                  12 A. Depending on the context, in the context                  13 of FQL, it either meant, well, in the context of                  14 FQL, it always meant the total number of share                  15 objects that were created and incremented the share 11:05:21                  16 counter for a given URL, a subset of those.                  17 Q. What did you mean by, a subset of those?                  18 A. Not all share objects created are                  19 accounted for in the share_count.                  20 Q. Which ones are not? 11:05:59                  21 A. Any share objects that failed to create,                  22 or any race conditions that would have occurred that                  23 we didn't check for would not have been counted.                  24 Q. And what is a race condition?                  25 A. In the context of what I just said, if two 11:06:17                  Page 77</p>

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<p>1 Q. Are there any others? 02:43:08</p> <p>2 A. There is a developer tool that can be used</p> <p>3 to visualize a URL, and update a global share</p> <p>4 object. That --</p> <p>5 Q. Sorry. 02:43:26</p> <p>6 A. That developer tool would also have a</p> <p>7 preview of the same preview I just mentioned within</p> <p>8 it, but that depends on the time in question.</p> <p>9 Q. Does the developer tool have a name?</p> <p>10 A. It has gone by many names. 02:43:40</p> <p>11 Q. What are they?</p> <p>12 A. It's gone by the OG debugger, it's gone by</p> <p>13 the OG linter, it's gone by the ID or URL debugger.</p> <p>14 Q. Other than that tool, are there any other</p> <p>15 visual representations of the global share object 02:44:04</p> <p>16 created by Facebook?</p> <p>17 A. I don't know of any other visual</p> <p>18 representations of the object.</p> <p>19 Q. And if you'd look at Exhibit 14 in the</p> <p>20 right-hand column, there, do you see the heading, 02:44:19</p> <p>21 alternate renderers?</p> <p>22 A. Yes.</p> <p>23 Q. Do you know what that means?</p> <p>24 A. I don't know specifically what that means.</p> <p>25 Q. Have you ever heard of permalink? 02:44:30</p> <p style="text-align: right;">Page 162</p>	<p>1 visual representation of this object. 02:45:53</p> <p>2 Q. What would it bring you to?</p> <p>3 A. It would bring you to the source code that</p> <p>4 governs ENTGlobalShare.</p> <p>5 Q. Then do you see the heading, class 02:46:05</p> <p>6 methods?</p> <p>7 A. Yes.</p> <p>8 Q. What are class methods?</p> <p>9 A. Class methods, in this context, are</p> <p>10 methods developers have added to the ENTGlobalShare 02:46:20</p> <p>11 class to expose fields to -- I'm sorry. It means</p> <p>12 they are methods that allow other Facebook engineers</p> <p>13 to access fields.</p> <p>14 Q. What fields?</p> <p>15 A. Well, the, they are listed in the class 02:46:48</p> <p>16 methods, so you can get things like action text</p> <p>17 info, all content for storm, all content ID for</p> <p>18 storm. I don't know what those are. Animated GIF</p> <p>19 video, et cetera.</p> <p>20 Q. How about the first one there, get data 02:47:10</p> <p>21 URL?</p> <p>22 A. Yes.</p> <p>23 Q. So, could a Facebook engineer access the</p> <p>24 data URL field by using one of the class methods?</p> <p>25 A. Yes. 02:47:36</p> <p style="text-align: right;">Page 164</p>
<p>1 A. Yes. 02:44:32</p> <p>2 Q. What is permalink?</p> <p>3 A. Permalink refers to a link where an object</p> <p>4 would hypothetically be a render, would render then</p> <p>5 if you click on it. 02:44:46</p> <p>6 Q. Do you know whether if you pull up this</p> <p>7 screen at, on a Facebook computer, what happens when</p> <p>8 you click on the permalink renderer note right</p> <p>9 there?</p> <p>10 A. I don't know what happens if you were to 02:45:06</p> <p>11 click on that.</p> <p>12 Q. Are you familiar with the term, I think</p> <p>13 it's memeology renderer?</p> <p>14 A. Unfortunately, I'm not familiar with that</p> <p>15 term. 02:45:15</p> <p>16 Q. Do you know what an ENTGlobalShare in</p> <p>17 Diffusion is? I'm just reading down that column.</p> <p>18 A. Yes.</p> <p>19 Q. What is that?</p> <p>20 A. Diffusion is another name of our 02:45:25</p> <p>21 repository browser that we mentioned earlier.</p> <p>22 Q. Do you know what the visual representation</p> <p>23 is of this ENTGlobalShare, if you click the</p> <p>24 Diffusion link?</p> <p>25 A. The Diffusion link wouldn't bring you to a 02:45:49</p> <p style="text-align: right;">Page 163</p>	<p>1 Q. Can you tell by looking at this Exhibit 14 02:47:48</p> <p>2 when this ENTGlobalShare was created?</p> <p>3 A. Yes.</p> <p>4 Q. When?</p> <p>5 A. That would be Monday, September 12, 2011, 02:48:08</p> <p>6 6:30 a.m.</p> <p>7 Q. And then above that, there's a, there's a</p> <p>8 heading for update time.</p> <p>9 What is update time, as that term is used</p> <p>10 there? 02:48:22</p> <p>11 A. Actually, one second.</p> <p>12 Q. Sure.</p> <p>13 A. So, in response to my last question, I'd</p> <p>14 like to change my answer to, I'm not sure if that</p> <p>15 time -- 02:48:38</p> <p>16 Q. Which -- sorry.</p> <p>17 A. -- if that's the creation time, the time</p> <p>18 field. This depends on whether we are following the</p> <p>19 right paradigm for this particular entity type.</p> <p>20 Q. How can we ascertain whether we are 02:48:48</p> <p>21 following the right paradigm for this particular</p> <p>22 entity type?</p> <p>23 A. I would have to refer to the source code.</p> <p>24 Q. And what particularly in the source code</p> <p>25 would you look at to make that determination? 02:49:03</p> <p style="text-align: right;">Page 165</p>

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<p>1 line of this e-mail. 04:50:44                  2 MR. CHORBA: Objection. Lacks foundation.                  3 Calls for speculation.                  4 You can answer, if you know.                  5 THE WITNESS: I don't know exactly what Mr. Liu 04:50:59                  6 meant in the title of this diff.                  7 BY MR. CARNEY:                  8 Q. Do you recall whether you performed a code                  9 review of adding post-processing step to fetch the                  10 share and like associations? 04:51:14                  11 A. I don't recall.                  12 Q. Would the, would a record have been                  13 preserved at Facebook which would reveal whether in                  14 fact you had performed such a code review?                  15 A. Yes. 04:51:30                  16 Q. And where would that information reside?                  17 A. In the revision detail link.                  18 Q. In what system?                  19 A. In this document.                  20 Q. So, if I clicked on the link there, 04:51:45                  21 tools.Facebook.com/D188969, that information would                  22 be revealed?                  23 A. Yes.                  24 Q. What is, taste, as the term is used in                  25 this document? 04:52:01</p> <p style="text-align: right;">Page 226</p>	<p>1 able to answer that question. 04:53:58                  2 Q. Are there documents that you could review                  3 that you know exist that would allow for you to                  4 answer the question?                  5 A. Yes. 04:54:12                  6 Q. What are they?                  7 A. Facebook source code.                  8 Q. And how would you find the lines of code                  9 that would answer that question if you had access to                  10 the source code in the room today? 04:54:22                  11 A. I would look back to December 3, 2010 and                  12 see if that code existed before this revision.                  13 Q. I did limit that temporally. Let me ask                  14 the question without any temporal limitation.                  15 Is there code at Facebook which allows for 04:54:48                  16 the fetching of like information for purposes of                  17 providing recommendations?                  18 MR. CHORBA: Objection. Vague as to time. I                  19 know you intended to lift the temporal limitation,                  20 but are you talking about today? 04:55:09                  21 MR. CARNEY: At any time.                  22 THE WITNESS: I'm not sure if there is code at                  23 Facebook which allows for the fetching of like                  24 information for the purposes of providing                  25 recommendations, other than what was introduced or 04:55:26</p> <p style="text-align: right;">Page 228</p>
<p>1 MR. CHORBA: Objection. Lacks foundation. 04:52:02                  2 You can answer, if you know.                  3 THE WITNESS: Taste is a back end for providing                  4 recommendations.                  5 BY MR. CARNEY: 04:52:12                  6 Q. And what does, back end, mean in that                  7 answer you just gave?                  8 A. It is a server that a, a web server would                  9 communicate with to fetch information.                  10 Q. And what is a recommendation? 04:52:31                  11 A. A recommendation is a link, typically, a                  12 link that we think a user would find relevant.                  13 Q. And how is that information presented to                  14 the user?                  15 A. For this particular diff, it would have 04:52:55                  16 been presented in a social plugin called the                  17 recommendations plugin.                  18 Q. Subsequent to December 2010, was there                  19 code which allowed for the fetching of like                  20 information for purposes of providing 04:53:38                  21 recommendations?                  22 A. I'm not sure.                  23 Q. Who would best be able to answer that                  24 question?                  25 A. I'm probably the person who would best be 04:53:56</p> <p style="text-align: right;">Page 227</p>	<p>1 supposedly introduced in this. 04:55:29                  2 BY MR. CARNEY:                  3 Q. What types of things are recommended by                  4 the taste back end?                  5 MR. CHORBA: Objection. Vague. 04:56:04                  6 THE WITNESS: What do you mean by, types of                  7 things? Just --                  8 BY MR. CARNEY:                  9 Q. Is it consumer goods? Is it restaurants?                  10 Is it trips? I have no idea. 04:56:28                  11 A. It depends on the time period in question.                  12 Q. Okay. How about in 2011?                  13 A. In 2011, I believe it was only URLs.                  14 Q. And would they be URLs that included                  15 commercial URLs, that is, commercial companies 04:56:47                  16 selling products to consumers?                  17 A. I don't think it differentiated between                  18 URLs.                  19 Q. And how, were you involved in drafting                  20 source code for purposes of identifying 04:57:01                  21 recommendations?                  22 A. Not directly.                  23 Q. Indirectly?                  24 A. Well, we've previously established that I                  25 wrote the code to add a counter, and I believe that 04:57:27</p> <p style="text-align: right;">Page 229</p>

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1 review it and then tell me if you can identify it. 05:52:43  
 2 A. This appears to be a copy of a printout of  
 3 an e-mail automatically generated by a code review  
 4 request.  
 5 Q. And it says from you at the top, right? 05:53:06  
 6 A. Yes.  
 7 Q. And what does that mean?  
 8 A. That means that the automated system  
 9 detected me as the revision author and sent this  
 10 e-mail on my behalf. 05:53:18  
 11 Q. And why would it have identified you as  
 12 the author?  
 13 A. I was likely the author on the revision.  
 14 Q. Okay. Is there an author field that your  
 15 name would appear in, and that's why it created this 05:53:33  
 16 e-mail as coming from you?  
 17 A. Not as such. It's, if you create a diff,  
 18 it automatically populates.  
 19 Q. Okay. And it says, it says you requested  
 20 code review of open graph like share unit prevent 05:53:54  
 21 rare fatal.  
 22 What does that mean?  
 23 A. That means that on occasion, Facebook  
 24 would stop processing a web request and would return  
 25 no information, and this revision was to prevent 05:54:16  
 Page 250

1 that from happening. 05:54:21  
 2 Q. And what is get share data? It's on the  
 3 second line of the middle paragraph.  
 4 A. I believe get share data is one of the  
 5 class methods on ENT share that we previously 05:54:32  
 6 discussed.  
 7 Q. What does it do?  
 8 A. I believe it gets the raw share object,  
 9 but I would have to check the code to be sure.  
 10 Q. What is a raw share object? 05:55:04  
 11 A. That is the FB Object, capital O,  
 12 underlying the ENT share abstraction.  
 13 MR. CARNEY: Mark the next exhibit, please.  
 14 (Exhibit 25 was marked for identification  
 15 by the court reporter and is attached hereto.) 05:55:29  
 16 BY MR. CARNEY:  
 17 Q. Can you identify that document.  
 18 A. As stated before, I believe it's a  
 19 printout of an e-mail for a diff request.  
 20 Q. And do you recall having any involvement 05:56:06  
 21 in the code review of record click\_count for URLs  
 22 and link shim post send logging?  
 23 A. No.  
 24 Q. Do you know what link shim post send  
 25 logging is? 05:56:20  
 Page 251

1 A. Yes. 05:56:21  
 2 Q. What is it?  
 3 A. It is the logging that happens when a user  
 4 visits a third party link on Facebook, link shim.  
 5 Q. What is in the tracking info field on a 05:56:43  
 6 share object? And I'm looking at the second line  
 7 there of the second paragraph.  
 8 MR. CHORBA: Objection. Vague as to time.  
 9 THE WITNESS: It does depend on time.  
 10 BY MR. CARNEY: 05:57:02  
 11 Q. Let's start with January 24, 2012.  
 12 A. The tracking info on a share object here  
 13 refers to the global share object, and that was the  
 14 set of comma delimited numbers we previously talked  
 15 about, so, Exhibit 14? 05:57:17  
 16 Q. Uh-huh. Who is the best person to talk to  
 17 about the creation of source code for taste?  
 18 MR. CHORBA: Objection. Vague as to, best.  
 19 BY MR. CARNEY:  
 20 Q. Most knowledgeable. 05:58:14  
 21 MR. CHORBA: Answer, if you know.  
 22 THE WITNESS: It depends on the time period in  
 23 question.  
 24 BY MR. CARNEY:  
 25 Q. How about 2010 through 2012? 05:58:21  
 Page 252

1 A. That would probably be Mr. Liu. 05:58:25  
 2 Q. Is Mr. Liu still with the company?  
 3 A. No.  
 4 Q. Do you know where he works?  
 5 A. No. 05:58:33  
 6 Q. Have you had any contact with him since he  
 7 left Facebook?  
 8 A. No.  
 9 Q. If I couldn't contact Mr. Liu, who would  
 10 be the second best person to talk to? 05:58:42  
 11 A. Would likely be an engineer on the taste  
 12 team.  
 13 MR. CARNEY: Next exhibit, please.  
 14 (Exhibit 26 was marked for identification  
 15 by the court reporter and is attached hereto.) 05:59:33  
 16 BY MR. CARNEY:  
 17 Q. Can you identify this document.  
 18 A. Yes.  
 19 Q. What is it?  
 20 A. This is a printout of a automated or of an 05:59:59  
 21 e-mail of an automated diff request.  
 22 Q. Who is Mr. Rothbart?  
 23 A. Mr. Rothbart is an engineer at Facebook.  
 24 Q. Was he your boss in 2012?  
 25 A. No. 06:00:16  
 Page 253

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<p>1 describes a user, a Facebook user. 06:28:07                  2 Q. Can you give me an example.                  3 A. My user ID is [REDACTED]                  4 Q. Truly -- okay. And then what is an object                  5 ID, something in the, what is something in the 06:28:24                  6 object ID range?                  7 A. For example, if you look at Exhibit 14,                  8 the ID listed at the top.                  9 Q. An that's the ENTGlobalShare ID?                  10 A. Yes. 06:28:39                  11 Q. Can you define the term, stored, as you                  12 used it in your answer?                  13 A. In this answer, or --                  14 Q. Uh-huh, yeah.                  15 A. In this answer, I mean a persistent store. 06:28:58                  16 Q. Let's capture the databases that are                  17 involved in holding objects and associations created                  18 from private messages prior to persistent storage.                  19 A. That would be on the web server itself,                  20 within RAM. 06:29:27                  21 Q. Any other places other than -- is web                  22 server a class of database?                  23 A. It's a class of server. A database is a                  24 different class of server.                  25 Q. What's the difference between a server and 06:29:50                  Page 270</p>	<p>1 I, RAY HE, do hereby declare under penalty of                  2 perjury that I have read the foregoing transcript,                  3 volume I; that I have made any corrections as appear                  4 noted, in ink, initialed by me; that my testimony as                  5 contained herein, as corrected, is true and correct.                  6 EXECUTED this ____ day of _____,                  7 201____, at _____,                  (City) (State)                  8                  9                  10                  11 _____                  RAY HE                  VOLUME I                  12                  13                  14                  15                  16                  17                  18                  19                  20                  21                  22                  23                  24                  25                  Page 272</p>
<p>1 a database? 06:29:51                  2 A. One is a subset of the other.                  3 Q. Which is a subset of the other?                  4 A. A server can host a database.                  5 Q. Other than -- I may have asked you this; 06:30:17                  6 if I did, I apologize -- other than the web server,                  7 are there any other databases or servers that are                  8 involved in the storage of objects and associations                  9 with respect to private messages prior to persistent                  10 storage? 06:30:39                  11 MR. CHORBA: Objection. Asked and answered.                  12 THE WITNESS: No.                  13 MR. CARNEY: Okay. Thank you.                  14 MR. CHORBA: Thank you.                  15 THE VIDEOGRAPHER: This marks the end of volume 06:30:50                  16 1, disk 4, and concludes --                  17 MR. CHORBA: Let me make clear, we're                  18 designating this highly confidential, attorneys'                  19 eyes only, subject to review.                  20 MR. CARNEY: Yeah. Thanks. 06:31:00                  21 THE VIDEOGRAPHER: This marks the end of volume                  22 1, disk 4, and concludes the deposition of Ray He.                  23 The time is 4:31 p.m., and we are off the record --                  24 6:31 p.m., and we are off the record.                  25 (Time noted: 6:31 p.m.) 06:31:15                  Page 271</p>	<p>1 I, the undersigned, a Certified Shorthand                  2 Reporter of the State of California, do hereby                  3 certify:                  4 That the foregoing proceedings were taken                  5 before me at the time and place herein set forth;                  6 that any witnesses in the foregoing proceedings,                  7 prior to testifying, were duly sworn; that a record                  8 of the proceedings was made by me using machine                  9 shorthand which was thereafter transcribed under my                  10 direction; that the foregoing transcript is a true                  11 record of the testimony given.                  12 Further, that if the foregoing pertains to the                  13 original transcript of a deposition in a Federal                  14 Case, before completion of the proceedings, review                  15 of the transcript [X] was [ ] was not requested.                  16 I further certify I am neither financially                  17 interested in the action nor a relative or employee                  18 of any attorney or party to this action.                  19 IN WITNESS WHEREOF, I have this date subscribed                  20 my name.                  21                  22 Dated:10/9/15                  23                  24 &lt;%signature&gt;                  CHRIS TE SELLE                  CSR No. 10836                  25                  Page 273</p>