

EXHIBIT 2-11

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

ORACLE AMERICA, INC.,)
 Plaintiff,)
vs.) No. CV 10-03561 WHA
GOOGLE, INC.,) VOLUME I
 Defendant.)

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Videotaped Deposition of ROBERT VANDETTE,
taken at 42 Chauncy Street, Boston,
Massachusetts, commencing at 10:02 a.m.,
Wednesday, September 7, 2011, before
Jill Shepherd, RPR, MA-CSR No. 148608,
NH-CSR No. 128, CA-CSR No. 13275, CLR,
and Notary Public.

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1 preserve the objection. I don't believe
 2 this was produced to Oracle, but perhaps you
 3 can confirm that after this deposition and
 4 we can take it off line.
 5 Q. Are you familiar -- have you seen this
 6 presentation before?
 7 A. (Witness reviewing document).
 8 MS. AGRAWAL: Objection. Form.
 9 MR. FRANCIS: I would note that
 10 this presentation is cited in Oracle's claim
 11 charts.
 12 MS. AGRAWAL: The video?
 13 MR. FRANCIS: So you should be
 14 familiar with it.
 15 MS. AGRAWAL: The video or the
 16 actual presentations?
 17 MR. FRANCIS: Both, I believe.
 18 MS. AGRAWAL: All right. Let's
 19 take it off line.
 20 A. (Witness reviewing document).
 21 I may have seen a presentation similar
 22 to this. I can't confirm that this is the
 23 exact content that I have seen or whether I
 24 read through the entire presentation.
 25 Q. Okay. Just for a second, jump to slide 11,

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1 there's a diagram that's labeled "Dalvik
 2 Trace JIT Flow"?
 3 A. Okay.
 4 Q. Have you seen this before?
 5 A. No, I have not.
 6 Q. Now looking at slide five, the third point
 7 that's listed here, it says, "Typically,
 8 less than a third of time spent in the
 9 interpreter."
 10 Do you see that?
 11 A. This is very subjective.
 12 Doing what?
 13 Q. Do you understand generally what it means?
 14 I'm not asking if you agree, but do you
 15 understand what it's saying here?
 16 A. I would just like to come to your point --
 17 MS. AGRAWAL: Objection. Form.
 18 A. -- with the data on this slide that shows
 19 that running the checkers, that you're
 20 running 93 percent of the time in JIT code
 21 cache. So you are using almost 100 percent
 22 of the CPU when you are running checkers, so
 23 how do you conclude, then, that one-third of
 24 the time you are, on average, in
 25 interpreter?"

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1 Q. All I asked if you see this third line, and
 2 if you understand what it seems to be
 3 saying. I'm not asking if you agree with
 4 it.
 5 A. I do not agree with --
 6 MS. AGRAWAL: You've got to let me
 7 object. The court reporter has to be able
 8 to take it down. Sorry.
 9 Objection. Form.
 10 A. I do see it and I do not agree with it.
 11 Q. Have you run any tests to determine what
 12 percentage of the time the CPU spends
 13 executing byte codes as opposed to natively
 14 compiled code?
 15 MS. AGRAWAL: Objection. Form.
 16 A. I have performance analysis in the past on
 17 our own virtual machines, and it very much
 18 depends on the byte codes and the program
 19 that you are running whether it spends
 20 little or a lot of time in the JIT -- or in
 21 executing byte codes, I'm sorry.
 22 Q. Maybe we can clarify just a little bit.
 23 Your performance report is measuring
 24 the performance of the Dalvik Virtual
 25 Machine, but not Android operating system

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1 overall --
 2 MS. AGRAWAL: Objection. Form.
 3 Q. -- is that correct?
 4 MS. AGRAWAL: Objection. Form.
 5 A. It's difficult to answer that question
 6 because the Dalvik Virtual Machine is part
 7 of the Android operating system, so which
 8 part are you --
 9 Q. Is it part of the prior Android operating
 10 system?
 11 MS. AGRAWAL: Objection. Form.
 12 A. My report states that I disabled much of the
 13 Android platform so the CPU was available
 14 for executing these benchmarks, so...
 15 Q. In a normal environment, is much of the
 16 Android platform disabled?
 17 MS. AGRAWAL: Objection. Form.
 18 A. In the normal Android platform, there is
 19 many Dalvik Virtual Machines running, which
 20 could have interfered with my results.
 21 Q. In a normal environment, is there anything
 22 other than a Dalvik Virtual Machine running
 23 on the Android operating system?
 24 MS. AGRAWAL: Objection. Form.
 25 A. It's running on top of the Linux kernel, but

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1 Q. I'm not asking you for a specific number.
 2 Give me a general ballpark figure.
 3 MS. AGRAWAL: Objection. Form.
 4 A. You are asking me to describe changes or
 5 incremental performance improvements in
 6 groups that I really wasn't involved in.
 7 Q. Turning to page eight, paragraph 28 of your
 8 report, you discuss the modifications that
 9 you made to conduct your experiments; is
 10 that correct?
 11 A. Yes.
 12 Q. And you created these modifications based on
 13 what you were told by Professor Mitchell and
 14 Peter Kessler; is that correct?
 15 MS. AGRAWAL: Objection. Form.
 16 A. Yes. We discussed the functionality, and
 17 Peter I both looked through the sources to
 18 try to find out how to properly disable this
 19 functionality, and we came to a consensus.
 20 Q. It appears that you attempted two out of
 21 three possible scenarios here?
 22 A. That's correct.
 23 MS. AGRAWAL: Sorry, objection.
 24 Form.
 25 Q. The first scenario in paragraph 28 is

1 building side tables, but not quickening
 2 instructions, and the second scenario is not
 3 building side tables or quickening
 4 instructions; is that correct?
 5 A. That's correct.
 6 Q. Is there a third possibility of not building
 7 side tables, but building quickening
 8 instructions?
 9 MS. AGRAWAL: Objection. Form.
 10 A. The quickening was dependent upon the side
 11 table for its implementation in order to
 12 avoid, you know, any possible error in the
 13 results. We did not want to substantially
 14 modify Dalvick in order to try to attempt
 15 that. We wanted to restrict our changes to
 16 just simple commenting out of code that
 17 would provide the before and after.
 18 Q. So if it got too complicated, you did not
 19 attempt it?
 20 MS. AGRAWAL: Objection. Form.
 21 A. It's not an issue of complication. It's an
 22 issue of possibly altering the Dalvick to
 23 the point where I wouldn't be measuring what
 24 I wanted to measure.
 25 Q. It would be --

1 A. It would impact the results potentially,
 2 since I'd be adding additional functionality
 3 to Dalvick that it doesn't currently have.
 4 Q. It would, however, be technically possible
 5 for someone to do so?
 6 MS. AGRAWAL: Objection. Form.
 7 A. Let's see. It may be technically possible
 8 to build a system that does quickening
 9 without side tables, but it would involve
 10 adding additional overhead that Dalvick
 11 doesn't currently have.
 12 Q. In paragraph 36, you state that you did not
 13 try running the trace compiler; is that
 14 correct?
 15 A. Oh, paragraph -- sorry. That is correct,
 16 for the same reason that we didn't do the
 17 quickening alone.
 18 Q. What is the trace compiler?
 19 MS. AGRAWAL: Objection. Form.
 20 A. That is Dalvick's implementation of a JIT.
 21 Q. Are you saying that for your performance
 22 benchmark regarding the '104 patent you had
 23 to disable the JIT?
 24 MS. AGRAWAL: Form.
 25 A. That's correct.

1 Q. Do you understand that the JIT is not part
 2 of the accused functionality of the '104
 3 patent?
 4 MS. AGRAWAL: Objection. Form.
 5 A. I'm not certain that it isn't somehow
 6 involved in some of the claims, but we
 7 focused on turning off the functionality in
 8 a mode that was possible.
 9 Q. If, in fact, JIT is not part of the accused
 10 functionality, then wouldn't disabling it
 11 affect the performance of this benchmark?
 12 MS. AGRAWAL: Objection. Form.
 13 A. I do believe that the numbers would be
 14 slightly different; however, the overhead of
 15 having to re-resolve all of the classes,
 16 fields, and methods is a fixed overhead that
 17 the JIT could not compensate for. So I
 18 believe the performance reduction or
 19 degradation would still be substantial.
 20 Q. Despite fixed overhead, you are referring to
 21 other aspects of the benchmarking programs
 22 might execute faster if the JIT was enabled;
 23 is that correct?
 24 MS. AGRAWAL: Objection. Form.
 25 A. They would be severely diminished by the

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1 JIT compiler?
 2 MS. AGRAWAL: Objection. Form,
 3 beyond the scope.
 4 A. I understand that HotSpot method-based JIT
 5 compiler and Android is a trace-based JIT
 6 compiler.
 7 Q. If Android was using a method-based JIT
 8 compiler, is it your belief that it would
 9 infringe the patent?
 10 MS. AGRAWAL: Objection. Form,
 11 beyond the scope.
 12 A. You'd have to show me and my team the
 13 implementation in order to determine that.
 14 Q. Does HotSpot practice -- strike that.
 15 Does the HotSpot Just-In-Time compiler
 16 practice the '205 patent?
 17 MS. AGRAWAL: Objection. Form,
 18 beyond the scope.
 19 A. It's my understanding that this patent was
 20 issued around the time of early Java, but we
 21 had alternative -- we had a -- you know, a
 22 pre-computer HotSpot compiler, so it's hard
 23 to say. My guess, I would believe it would.
 24 Q. The current HotSpot Just-In-Time compiler
 25 practices the '205 patent?

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1 MS. AGRAWAL: Objection. Form,
 2 beyond the scope, and calls for a legal
 3 conclusion.
 4 A. From my understanding, I believe it does.
 5 Q. Did you try comparing the performance of a
 6 current HotSpot Just-In-Time compiler with
 7 one that existed before the '205 patent?
 8 MS. AGRAWAL: Objection. Form,
 9 beyond the scope.
 10 A. From my report, I measured the current
 11 HotSpot implementation.
 12 Q. Looking at page 18 of your report, the chart
 13 here is entitled "Android CaffeineMark JIT
 14 Improvement Results."
 15 Does this reflect the difference
 16 between running Android with and without a
 17 JIT?
 18 MS. AGRAWAL: Objection. Form.
 19 I also just note for the record that
 20 we produced this to Google in color, and so
 21 this isn't the original that was -- the
 22 report wasn't what was given to Google; but
 23 you can answer the question.
 24 A. The command that I used to execute is in the
 25 report. It's on paragraph 49. I used

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1 -Xint:fast mode and the -Xint:jit mode for
 2 the interpreter versus the JIT-enabled
 3 results.
 4 Q. Paragraph 49, you say, "These tests show the
 5 performance difference that JIT provides
 6 above and beyond interpreter only"; is that
 7 correct?
 8 A. Yes.
 9 Q. Is the accused functionality the entire JIT
 10 or only a specific portion within the JIT?
 11 MS. AGRAWAL: Objection. Form.
 12 A. As I understand it, it's the technique used
 13 to store the results of the JIT and such.
 14 If you are unable to store the results of
 15 the trace JIT, you wouldn't have a JIT;
 16 therefore, disabling the JIT is comparable
 17 to disabling the patent.
 18 Q. Are there other ways to store the results of
 19 the JIT?
 20 MS. AGRAWAL: Objection. Form,
 21 beyond the scope.
 22 A. I don't know. You are asking: Are there
 23 other ways to store the results that are not
 24 infringing? Is that what you are asking me?
 25 Q. I'm asking you: Is the only way to

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1 implement a JIT is by using the '205 patent?
 2 MS. AGRAWAL: Objection. Form,
 3 beyond the scope.
 4 A. I don't know.
 5 Q. If there was a way to implement a JIT
 6 without practicing the '205 patent, would it
 7 make sense to benchmark the performance
 8 between that JIT and the current Android JIT
 9 that Oracle alleges infringes the '205
 10 patent?
 11 MS. AGRAWAL: Objection. Form,
 12 beyond the scope.
 13 A. You are asking me to speculate on something
 14 which I have already stated that I don't
 15 know how you would do. So, again, the
 16 answer is, I don't know.
 17 Q. In paragraph 53, you say, "Before starting
 18 each benchmark run, the script cleans out
 19 the dalvik-cache."
 20 Do you see that?
 21 A. Yes.
 22 Q. What is in the dalvik-cache?
 23 MS. AGRAWAL: Objection. Form.
 24 A. The dalvik-cache contains an optimized
 25 version of the dex file, and if you run --

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