

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BMW OF NORTH AMERICA, LLC AND

ROBERT BOSCH LLC,

Petitioner

v.

FORAS TECHNOLOGIES LIMITED

Patent Owner

Case IPR2024-01346

U.S. Patent No. 7,627,781

Case IPR2024-01347

U.S. Patent No. 7,624,302

REMOTE ORAL DEPOSITION OF

MICHAEL C. BROGIOLI, PH.D.

FRIDAY, JUNE 6, 2025

REPORTED BY: Debra Stevens, RPR/CRR

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TransPerfect Legal Solutions
212-400-8845 - Depo@TransPerfect.com

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Foras Technologies Ltd.
Ex. 2006 - Page 1

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2 REMOTE ORAL DEPOSITION OF MICHAEL

3 C. BROGIOLI, produced as a witness at
4 the instance of the Patent Owner and
5 duly sworn, was taken in the
6 above-styled and numbered cause on the
7 above-referenced date, from 10:00 a.m.
8 Eastern Daylight Time, reported remotely
9 via videoconference by realtime
10 stenographic means by Debra Stevens,
11 Certified Realtime and Registered
12 Professional Reporter.

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2 R E M O T E

3 A P P E A R A N C E S:

4

5 BC LAW GROUP, PC

6 Attorneys for Patent Owner

7 200 Madison Avenue, 24th Floor

8 New York, New York 10016

9 BY: SETH LINDNER, ESQ. (Austin, Tx)

10 slindner@bclgpc.com

11 ROBERT AUCHTER, ESQ. (Washington, D.C.)

12 rauchter@bclgpc.com

13

14 FINNEGAN, HENDERSON, FARABOW,

15 GARRETT & DUNNER LLP

16 Attorneys for Petitioner and

17 the Witness Herein

18 Two Seaport Lane

19 Boston, Massachusetts 02210-2001

20 BY: XIRUI ZHANG, PH.D., ESQ.

21 xirui.zhang@finnegan.com

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E X A M I N A T I O N S

Witness	Page
M. Brogioli	7
By Mr. Lindner	112
By Mr. Auchter	

E X H I B I T S

Prior Exhibits Referenced Herein:

Exhibit:

1001 re '302 Patent
1001 re '781 Patent
1002 re '302 Patent
1002 re '781 Patent
1005
1007
1008
1011
1028

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COURT REPORTER: This is Debra Stevens, Court Reporter and Notary Public for the State of New York. Would you like to have some colloquy before I swear the witness in?

MS. ZHANG: Yes, thank you. Counsel, can we agree we have one transcript for both proceedings today?

MR. AUCHTER: Yes.

MS. ZHANG: If I understand correctly, Mr. Lindner will ask questions for one proceeding and Mr. Auchter will ask questions for the other proceeding?

MR. AUCHTER: In general, yes, although there is quite a bit of overlap. And our intent is to not ask repetitive questions and repeat the same questions the second time if it is about the same reference.

For example, if Mr. Lindner asks questions about the Fox reference or the Arai reference or what have you, we would assume those apply to both

1 Proceedings

2 proceedings to avoid the need to keep
3 Dr. Brogioli here just to say the same
4 thing twice.

5 MS. ZHANG: Understood. And when
6 you switch, would you make that clear,
7 which proceeding it is for?

8 MR. AUCHTER: To the extent of
9 the proceeding, of course. And it would
10 be a switch; it would not be a tag team
11 questioning.

12 MS. ZHANG: Okay. That is great.
13 And please indicate what proceedings
14 your questioning is for. Is it for both
15 proceedings or for one proceeding?

16 MR. AUCHTER: As I said,
17 sometimes it will be for both
18 proceedings. Sometimes, if it is
19 specific to claim language, it would
20 obviously be only relevant to the one
21 proceeding.

22 MS. ZHANG: Okay.

23 COURT REPORTER: May I go ahead
24 and swear the witness in?

25 MS. ZHANG: Yes.

1 M. BROGIOLI

2 COURT REPORTER: I am authorized
3 to administer oaths remotely so long as
4 counsel will stipulate that the witness
5 has been properly identified and is, in
6 fact, Michael Brogioli.

7 MS. ZHANG: Yes.

8 MR. AUCHTER: So stipulated.

9 Whereupon,

10 M I C H A E L C. B R O G I O L I,
11 having been first duly sworn/affirmed, was
12 examined and testified as follows:

13 EXAMINATION BY

14 MR. LINDNER:

15 Q. Good morning.

16 A. Morning.

17 Q. Can you state your name for me,
18 please?

19 A. Yes. It is Michael Brogioli.

20 Q. Nice to see you. I am Seth
21 Lindner with BC Law Group on behalf of the
22 Patent Owner in these two matters.

23 I will be asking you questions
24 today regarding the Petition for IPR
25 2024-1 -- sorry. Let me start that again.

1 M. BROGIOLI

2 IPR 2024-01346. That relates to U.S. Patent
3 Number 7,627,781, and I will be asking you
4 about your declaration that you submitted
5 for that IPR. Sound good?

6 A. Sounds good.

7 Q. So, just for some shorthand here,
8 I will do my best to refer to the Petition
9 for the IPR I just read the number to as
10 "the '781 Petition." There is a good chance
11 I may also just call it "the Petition." So,
12 when I am referring to "the Petition" or
13 "the '781 Petition" in my questions, can you
14 agree that that will refer to the Petition
15 for IPR 2024-01346?

16 A. Understood. Yes.

17 Q. And again I will try to refer to
18 the declaration you submitted for the '781
19 Petition as your '781 declaration. I may
20 also call it "your declaration." And can we
21 agree that when I refer to that declaration,
22 we are talking about the declaration you
23 submitted for the '781 Petition, in support
24 of it?

25 A. Understood. Okay.

1 M. BROGIOLI

2 Q. And then the last one is the
3 patent that is being challenged. I read you
4 the patent number a moment ago. I will call
5 that the '781 Patent. Does that sound good?

6 A. Yes.

7 Q. All right. One more piece of
8 shorthand. You have referred in your
9 declaration a number of times to a person of
10 ordinary skill in the art. I will be
11 referring to that as a POSITA, P-O-S-I-T-A,
12 which I think is the same term you have used
13 in your declaration. Does that sound okay?

14 A. Yes.

15 Q. Where are you located right now?

16 A. I am in a conference room in
17 Finnegan's office here in Boston,
18 Massachusetts.

19 Q. And do you have any printed
20 materials with you?

21 A. I do. I have clean, unmarked
22 copies of both patents, both of my
23 declarations. And I think that's it. Maybe
24 my CV is in here as well.

25 Q. Do you have electronic access to

1 M. BROGIOLI

2 the other documents in the record for the
3 '781 IPR?

4 A. I don't believe they are on the
5 machine that I am in front of for this, the
6 deposition software.

7 Q. Okay. So, I will place the
8 documents that we need to talk about, to the
9 extent that there are some we need to refer
10 to, into the chat, and we'll just make sure
11 that you can get access to those as I place
12 them there. Okay?

13 A. Okay.

14 Q. Other than Zoom, do you have any
15 other programs open on the computer that is
16 in front of you?

17 A. No.

18 Q. All right. So I would ask,
19 during the deposition today, that you not
20 access any other programs or communicate
21 with anyone using that computer. Does that
22 sound reasonable?

23 A. Yes.

24 Q. And if you need to refer to a
25 document to answer my questions that you

1 M. BROGIOLI

2 don't have, please let me know which one
3 and, if it is a document in the record, I
4 will provide it. Okay?

5 A. Okay.

6 Q. Other than counsel for Petitioner
7 in this matter, did you speak to anyone else
8 about the content of your declaration,
9 either while it was being prepared or after
10 it was prepared?

11 A. No.

12 Q. And in preparing for the
13 deposition today, did you speak to anyone
14 other than counsel for Petitioner about the
15 deposition?

16 A. No, I didn't.

17 Q. All right. So you have a printed
18 copy of your '781 declaration in front of
19 you, right?

20 A. Yes.

21 Q. So you will want to keep that one
22 handy. The other declaration, for the '302
23 Patent, you can kind of set to the side for
24 now.

25 A. Okay.

1 M. BROGIOLI

2 Q. So, I would like to begin with
3 paragraph 29 of your '781 declaration.

4 (Reporter interruption.)

5 Q. I have just put into the chat a
6 document marked Exhibit 1002, Brogioli
7 Declaration. Do you see that, Dr. Brogioli?

8 A. I do. Give me one second. It is
9 my first time opening a PDF on this
10 computer. (Pause.)

11 Yes. Good to go.

12 Q. Feel free to use the paper
13 version that you have or the one I have put
14 there in the chat.

15 A. All right.

16 Q. So, I would like to direct you to
17 paragraph 29 of your declaration. In this
18 paragraph you describe your opinion as to a
19 person of ordinary skill in the art. Would
20 you have considered yourself, on October 25,
21 2004, a person of ordinary skill in the art?

22 A. Yes.

23 Q. About halfway down in paragraph
24 29 of your '781 declaration you say that a
25 person of skill in the art would have at

1 M. BROGIOLI

2 least a bachelor's degree in computer
3 science, computer engineering or equivalent.
4 Do you see that?

5 A. I do.

6 Q. What is the difference between a
7 degree in computer science and a degree in
8 computer engineering?

9 A. Depending on how, I will just
10 say, a given undergrad student sets up their
11 elective courses, a computer science degree
12 may include a little bit more software and
13 algorithms, I guess, flavor versus computer
14 engineering perhaps having a bit more
15 hardware focus at times, things like circuit
16 design or other concepts like that.

17 Q. Are there subject matters that
18 are commonly covered under both types of
19 degree?

20 A. Yes.

21 Q. What would some of those be?

22 A. Some of the early freshman/
23 sophomore classes in, you know, science,
24 things of that nature. Mathematics,
25 physics, and then -- I guess I am answering

1 M. BROGIOLI
2 from my undergrad experience. Certain types
3 of like logic design classes or perhaps
4 things like data structures and algorithms
5 would be common.

6 I know in my undergrad I took
7 some of those more aggressive computer
8 science classes my latter years even though
9 I was in the engineering track.

10 Q. When did you earn your bachelor's
11 degree?

12 A. I think it was December of 1998.

13 Q. You have also said in your
14 declaration in paragraph 19 that an
15 equivalent bachelor's degree could also be a
16 part of a person of skill in the art -- an
17 education for a POSITA.

18 What are equivalent degrees in
19 your view?

20 A. So, things like electrical
21 engineering or perhaps other types of
22 engineering or STEM degrees, depending on
23 what that POSITA's undergrad curriculum
24 comprised.

25 Q. Are there particular courses

1 M. BROGIOLI
2 within one of these alternative degree
3 programs that you would view as necessary
4 for the purposes of establishing the person
5 as having ordinary skill in the art for this
6 proceeding?

7 A. Right. So, I would say it sort
8 of seems like there is a lot of different
9 labels that get put in types of undergrad
10 degrees. Even in the last couple months I
11 have seen, even Rice -- where I have been
12 faculty for 10 or 15 years -- we have a new
13 AI undergrad degree that is kind of computer
14 science plus whatever is the latest and
15 greatest so to speak.

16 But I would think this POSITA you
17 are asking about, not sort of tieing it to
18 whatever the title of this degree might be
19 at their particular university, would have
20 exposure to things like the concepts that I
21 talk about in my declaration and in the
22 prior art. So, things like computer
23 architecture. Or what is firmware? What is
24 hardware? How a digital computer works.
25 What's memory? Things of that kind of

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2 nature.

3 Q. In paragraph 29 of your
4 declaration you also say that a POSITA would
5 have at least two years experience with
6 computer architecture design. Do you see
7 that?

8 A. Yes.

9 Q. What is computer architecture
10 design?

11 A. So, the concepts that, for
12 example, electrical engineering or computer
13 engineering student might get introduced to,
14 sort of junior- to senior-year type stuff.
15 So, digital logic.

16 There is books called computer
17 architecture and computer organization and
18 logic design books that typically come into
19 play junior, senior year type time frame.
20 Things like designing -- you know, how do
21 you design an adder? Or how do you design
22 maybe a very simple computer?

23 Things like -- an example being
24 like a microprocessor lab that I took in
25 undergrad where we build circuits and

1 M. BROGIOLI
2 hardware that interface with a simple CPU
3 and then write low level firmware on the CPU
4 to do things like read credit cards and
5 things like that.

6 So, those types of computer
7 architecture concepts that that would entail
8 them having exposure to.

9 Q. To qualify as a POSITA in your
10 view, would a person of skill have had to be
11 familiar with a particular piece of
12 software?

13 A. I don't know that I have said
14 that or really contemplated that in my
15 declaration. I would say that they would
16 have familiarity with software and firmware,
17 which I think would come along somewhat
18 organically in the course of their undergrad
19 studies and perhaps this two years of
20 experience.

21 But in terms of a particular --
22 like a particular application, for example,
23 I don't -- I haven't really thought about
24 that.

25 Q. And is there a particular piece

1 M. BROGIOLI

2 of hardware that a person of skill would
3 have been necessarily familiar with to
4 qualify as a POSITA in your view?

5 A. I would say hardware in general.
6 The types of concepts I was talking about
7 before: CPU's or logic used to perform some
8 of the checking; the notion of like digital
9 memory in a computer, examples being like I
10 talk about IA-32 and IA-64. They may have
11 come across those concepts along the way as
12 well.

13 Q. So is it your view that in order
14 to qualify as a POSITA one would have been
15 familiar with particular hardware
16 architectures?

17 MS. ZHANG: Objection to form.

18 A. So, I would say -- if you are
19 asking would they be familiar with like a
20 Hewlett Packard PA 7000 processor from the
21 mid-nineties or something, I don't know that
22 that level of specificity is something --
23 that they would need to know a particular
24 vendor's particular SKU number or something
25 like that.

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2 But knowing about, for example,
3 microprocessors or how they are used and how
4 you program them and how they get integrated
5 with memory. Those kinds of things, they
6 would have familiarity with.

7 Q. Would it be the same answer then
8 for a specific programming environment?

9 A. So, I would say they would have
10 experience with things like firmware that I
11 talk about. Would they necessarily need
12 experience with -- coming up with an
13 example -- using Texas Instruments Developer
14 Studio from 2002 on a specific one of their
15 processors? Not necessarily, not with that
16 level of specificity.

17 Q. So to summarize that, your view
18 is that to qualify as a person of skill in
19 the art, that person would have been
20 familiar with software, hardware, hardware
21 architecture, programming environments
22 generally, but would not have had to have
23 particular familiarity with a particular
24 manufacturer's software or hardware or
25 hardware architecture or programming

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2 environment. Is that right?

3 MS. ZHANG: Objection to form and
4 misrepresentation.

5 A. So, there are things I talk about
6 under the firmware umbrella like a BIOS or
7 ACPI, all of which are well documented and
8 used across billions of devices. Those
9 kinds of things this person of skill in the
10 art would have familiarity with.

11 I was just saying I don't think
12 that they would need to have -- I haven't
13 wedded that familiarity to a specific model
14 number and part from the particular vendor
15 at a particular time. It would more be
16 these engineering concepts that I have
17 talked about in paragraph 29.

18 Q. All right. I would like to
19 direct you to paragraph 3 of your '781
20 declaration.

21 A. Okay.

22 Q. So you say here that you have
23 been asked to provide opinions regarding the
24 '781 Patent, "the prior art references that
25 form the basis for the invalidity grounds

1 M. BROGIOLI

2 set forth in the Inter Partes Review of the
3 '781 Patent and any other prior art
4 publications cited in this declaration."

5 Do you see that?

6 A. Yes.

7 Q. I just want to pick that apart a
8 bit to make sure, just for the record, I
9 have clarity on which ones we are talking
10 about. So, let me put a copy of the
11 Petition into the chat.

12 I have just uploaded to the chat
13 the Petition for the '781 IPR. Do you see
14 that?

15 A. I do.

16 Q. Did you say you had a paper copy
17 of this also?

18 A. I don't believe I do, no.

19 Q. We were talking about paragraph 3
20 and you mentioned in that paragraph, as I
21 said, the prior art references that form the
22 basis for the invalidity grounds. So just
23 for clarity, if you look at page -- numbered
24 page 1, which is the 13th page of the
25 document in my viewer, you see at the top of

1 M. BROGIOLI

2 that page of the Petition it says "Relief
3 Requested and Grounds"?

4 A. Yes.

5 Q. So in your declaration when you
6 referred in paragraph 3 to the prior art
7 references that form the basis for the
8 invalidity grounds set forth in the
9 Petition, you are referring to the exhibits
10 that are listed in this table on page 1 of
11 the '781 Petition, right?

12 A. That sounds right to me. That
13 looks like what I was referring to in
14 paragraph 3 of my declaration.

15 Q. Okay. And while we are here, for
16 shorthand today, I will be referring to the
17 exhibit that was marked as Exhibit 1005 as
18 Fox. I will be referring to the exhibit
19 that was marked 1006 as Safford. I will be
20 referring to the exhibit marked 1007 as
21 Arai, A-R-A-I. I will be referring to the
22 exhibit marked 1011 as Landry, L-A-N-D-R-Y.
23 I will be referring to Exhibit 1025 as Jin,
24 J-I-N. I will be referring to Exhibit 1012
25 as Bigbee, B-I-G-B-E-E.

1 M. BROGIOLI

2 Does that sound fair?

3 A. That sounds good.

4 Q. Okay. Back to your '781

5 declaration, you also have been asked to
6 provide opinions regarding any other prior
7 art publications cited in this declaration.
8 Do you see that?

9 A. Yes.

10 Q. As to your opinions regarding the
11 validity of the challenged claims of the
12 '781 Patent, are there any documents, other
13 than those listed on page 1 of the Petition
14 in the table that we just reviewed, that
15 form the basis of your opinions as to the
16 validity of the challenged claims of the
17 '781 Patent?

18 A. So, the references here in the
19 Petition are prior art references I talk
20 about in my declaration. I also -- I don't
21 see that I have a table of all references in
22 my declaration, but there are other
23 references I recall talking about, things
24 like the ACPI specification that I discussed
25 earlier this morning that are also present

1 M. BROGIOLI

2 in my declaration.

3 Q. So did any of those other
4 documents form the basis for your opinions
5 as to the validity of the challenged claims
6 of the '781 Patent?

7 MS. ZHANG: Objection to form.

8 A. So, I would say these references
9 in the Petition are the prior art references
10 I rely on in the grounds I discuss. I would
11 say that the opinions I talk about also
12 reference things that a POSITA would know,
13 like firmware. And I usually, in those
14 places, point to here is an example of a
15 BIOS or the system extraction layer in ACPI.

16 But I guess, without getting into
17 the legal definitions, the references in
18 that Petition table are the primary prior
19 art references and combinations I am talking
20 about.

21 Q. So when the Board makes its
22 determination as to the patentability of the
23 challenged claims of the '781 Patent, do
24 they need to go outside of the prior art
25 listed in the table on page 1 to make that

1 M. BROGIOLI

2 determination?

3 MS. ZHANG: Objection to form.

4 A. I guess I don't work at the PTAB
5 so I am not really sure what they do. But
6 these would be the prior art references they
7 would be considering in looking at my
8 opinions.

9 Q. Let me try to ask my question a
10 different way because you make a good point,
11 that you are not a PTAB judge.

12 So, we were talking about the
13 documents listed on page 1 of the Petition,
14 right?

15 A. That's right.

16 Q. And my question is: To reach a
17 technical conclusion as to whether the prior
18 art listed in that table discloses or
19 renders obvious all of the limitations of
20 the challenged claims of the '781 Patent,
21 would a person need to go outside of those
22 documents for some limitation or claim
23 element of those challenged claims?

24 MS. ZHANG: Objection to form,
25 foundation.

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2 A. So I would say, just as -- I am
3 back in my declaration at paragraph 3 --
4 that those prior art references are what
5 form the basis for the invalidity grounds in
6 my declaration, that list of six or seven
7 prior art references. And then, as you were
8 asking earlier, I offer opinions on other
9 publications in my declaration that are used
10 to provide examples of things that were
11 known. But those prior art references are
12 what I am discussing in the declaration.

13 Q. So there isn't a claim limitation
14 that you found in preparing your declaration
15 and reviewing the '781 Patent and each of
16 the challenged claims where disclosure of
17 that limitation was absent from the
18 references on page 1 of the Petition. Is
19 that right?

20 MS. ZHANG: Objection to form and
21 foundation.

22 A. I would say, as I recall, for
23 each of the claims and claim limitations I
24 discuss, the combinations fall within the
25 six references here shown in that table of

1 M. BROGIOLI

2 the Petition at page 1. I am just -- I
3 don't want to limit to the fact that I also
4 discuss other references throughout my
5 declaration in various places.

6 Q. I am going to upload the exhibit
7 that was marked as Exhibit 1008 to the chat.
8 It might take a moment. This is a big one.

9 A. Okay.

10 Q. Do you have that?

11 A. Yes.

12 Q. What is this document?

13 A. I am looking at the front page.
14 It is the Intel reference for IA-32. It's
15 the Intel architecture software developer's
16 manual. And then it says it is Volume 3 for
17 System Programming Guide.

18 Q. Where did you get this exhibit as
19 you were preparing your declaration?

20 A. I -- I am not sure I recall. So,
21 I have used this reference, this sort of set
22 of references. I have probably seen it many
23 times over the last 25 years. I don't
24 recall if maybe I cited this in the '958
25 IPR's and maybe that was when I first pulled

1 M. BROGIOLI
2 it down in relation to these overall Foras
3 IPR's. Or maybe somebody else had already
4 dug it up. I just don't recall the timeline
5 there.

6 But you can go get these
7 documents, as I recall, probably on the
8 Intel website. Maybe these are a little old
9 and they are no longer up there. These type
10 of things are available not just from Intel
11 but from other vendors or companies I've
12 worked at, telling people, hey, here is how
13 you use our latest and greatest processors
14 and things like that.

15 Q. In your work for this IPR, did
16 you form an opinion that the exhibit marked
17 1008 is prior art to the '781 Patent?

18 A. That sounds right. Going back to
19 my declaration, it looks like I listed in my
20 table here, in my Materials Considered going
21 from page numbered 6 to 7. This would have
22 been prior art.

23 And it looks like in that
24 table -- I am on page 7 of my declaration --
25 I put that this was publicly available at

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2 least as of February 14, 2002. So, that
3 sounds right, yes; this is the paragraph.

4 Q. So did you determine that this
5 document was publicly available at least as
6 of February 14, 2002?

7 A. That would sound right. I don't
8 recall the sort of afternoon where I may
9 have gone and downloaded this or searched
10 for it prior to the filing dates of the
11 patents. But everything I see here is
12 consistent with how these -- not only these
13 Intel documents but documents like this in
14 general are written, dated with copyrights
15 on them, et cetera.

16 Q. So other than the dates on the
17 document, did you use anything else to
18 ascertain whether this document was publicly
19 available in February 14, 2002?

20 A. I would say yes in the sense of
21 my experience with Intel products and these
22 types of references, and that these IA-32
23 processors were available for years prior to
24 the 2002 date that you are asking about.

25 But if the question is did I

1 M. BROGIOLI

2 personally speak to someone in Intel's
3 communications department or something, I
4 didn't do that myself, no.

5 Q. So as to the IA-32 processor, you
6 were familiar with its availability around
7 the 2002 time frame; but as to the actual
8 document in Exhibit 1008, you did not
9 investigate whether that document was
10 actually publicly available in 2002. Is
11 that correct?

12 A. I would say I would have
13 looked -- if I were looking for this
14 document on the internet or Intel's internet
15 site, for an example, I would have been
16 looking or searching for things that were
17 available prior to -- I think you are asking
18 about this 2002 or 2004 date. And that
19 would have been the process used to get this
20 document.

21 Also, nothing in here is
22 inconsistent, at least in terms of what I
23 talk about in my declaration, with what was
24 available in the early 2000's, late 90's, et
25 cetera, for Intel IA-32.

1 M. BROGIOLI

2 Q. Just to make sure that I am
3 understanding your answer clearly here, you
4 are saying that you would have looked. Does
5 that mean that you recall specifically
6 looking, or that if you wanted to look,
7 that's how you think you would have done it?

8 MS. ZHANG: Objection to form.

9 A. I will give you -- I will try to
10 give you a bit clearer answer.

11 So I don't recall the particular
12 day, for example, that I was going out and
13 finding this particular PDF. But the way
14 that I do that, as a matter of process, is
15 looking on, for example, a company's website
16 using, for example, a Google search and
17 setting the dates, in this example, to
18 2002 -- which is I think what you were
19 asking about -- and saying, okay, only show
20 me things that were available during this
21 window of time, don't show me things
22 available after, for example, would be the
23 process that I generally use for these types
24 of exercises, at least in part.

25 Q. I would like to ask you, while we

1 M. BROGIOLI
2 are looking at the table that spreads across
3 pages 7 and 8 and 9 of your '781
4 declaration, about a couple other of these
5 documents.

6 A. Okay.

7 Q. Do you see Exhibit 1028 listed
8 there on page 8 of your declaration?

9 A. Yes.

10 Q. And it shows a date of May 1997.
11 Do you see that?

12 A. I do.

13 Q. Is this a document that you
14 believe is prior art to the '781 Patent?

15 A. Yes. That sounds right, due to
16 the date that -- that 1997 date that you
17 just referenced.

18 Q. And other than the 1997 date, did
19 you base your opinion that this is prior art
20 on anything else?

21 A. I don't remember everything that
22 is in this document, but it would have been
23 consistent with the overall timeline of
24 prior versions to this version 1.4 being
25 available at dates earlier than that and

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2 other versions available subsequent to that
3 and where this fit in the overall timeline
4 and these documents being available to
5 people in the multiprocessor/multicore
6 community over the years.

7 Q. I am going to put a copy of the
8 exhibit that has been marked Exhibit 1028
9 into the chat. Do you see that?

10 A. Yes.

11 Q. So we can see on the first page
12 of the document that there is a date written
13 in blue lettering with some blue underlines
14 of May 1997, right?

15 A. Yes.

16 Q. So when you said in your
17 declaration you listed this document and
18 included that date in the table, is this
19 where you got that date?

20 A. I would say yes, in part. If we
21 jump down a bit to page 3 of 97, there is
22 also a revision history here that shows
23 prior iterations of this document going back
24 to, it looks like, October 27th of 1993
25 through '95, '96. And then the most recent

1 M. BROGIOLI
2 entry in time here is that May 12th of '97
3 date, some things around what has been
4 added.

5 So, this is all consistent with
6 not just these Intel references but how
7 other manufacturers or consortiums date and
8 archive the revisions of these kinds of
9 standards or standards-adjacent documents.

10 Q. On page 3 of Exhibit 1028, in the
11 revision history table that you just
12 mentioned, how do you interpret the fact
13 that several of the entries in this table
14 are written in blue font instead of black?

15 A. It -- I am not quite sure, but
16 typically that's entries that have been made
17 to what may be the current version that is
18 being drafted. So, for example, if version
19 1.0 is done, then these sort of blue colored
20 inserts all get kind of the stamp of
21 approval and then everything turns to black
22 text, right? And then if I start working on
23 version 1.1 but it is not done yet or I am
24 still drafting it, those new changes versus
25 1.0 might still be in blue.

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2 And we probably will see that
3 throughout the document, at least as we see
4 it in that table. You can see if you
5 continue down to any of the pages, really,
6 the version 1.4 in the lower left and right
7 also changes to being in blue because it
8 looks like this is the actively drafted
9 version.

10 And then, just randomly on page
11 33 of 97, there is a multiple I/O APIC
12 configuration section and a whole bunch of
13 that's in blue, so it looks like that has
14 been inserted for this version 1.4 draft.
15 That looks like what is going on.

16 Q. So if I am understanding it
17 right, you are saying that your
18 interpretation here is that the document
19 Exhibit 1028 represents some form of a draft
20 of this multiprocessor specification and
21 that a draft like this, when finalized by,
22 for example, Intel and published, would have
23 been done so with the font all in black
24 rather than having the blue text as shown,
25 for example, on page 1 of this exhibit?

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2 A. I am not sure that's quite
3 accurate. What I was saying was various
4 versions of these types of documents are
5 made available to the community, be it
6 version 1.0 or 1.1, et cetera. At times
7 versions are also made available, if it may
8 take a year to draft the new version or
9 something, where sections, new sections may
10 have been inserted. They may be in this
11 blue text that we are looking at here. And
12 those types of documents, just like this,
13 are also made available to your customers or
14 early adopters or what have you.

15 As to whether the text changes
16 from blue to black on a given version or
17 check point, it is probably up to however
18 the author or authors of the document choose
19 to do that. But either way, it's made
20 available.

21 Q. So what if anything did you do to
22 determine that this document in Exhibit 1028
23 was actually published as of May 1997?

24 A. I would say a similar answer to
25 what we were talking about maybe ten minutes

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2 ago. If I were looking for this document
3 online I would have been searching for
4 documents available prior to -- I think in
5 your other example, 2002. And this document
6 would come up as available during that
7 window. And everything within it talking
8 about versions and dates and prior versions
9 and history and copyright information, like
10 on the bottom of page 2, saying copyright
11 1993 to '7, with the 7 in blue, is
12 consistent with Intel having this document
13 available in that 1997 time frame.

14 Q. You said if you were looking for
15 this document online you would have been
16 searching for documents prior to a certain
17 date. Did you look online to search for
18 this document, Exhibit 1028?

19 A. Understood.

20 So, similar answer to before. I
21 don't recall there's a specific afternoon
22 where I was specifically looking for this
23 multiprocessor spec. I was just describing
24 the process I use when doing that. But I
25 don't recall with that level of specificity

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2 looking for this exact document in terms of
3 the specificity of the day or what afternoon
4 it was kind of thing.

5 Q. I am not asking if you recall
6 doing something on a particular day. I am
7 asking whether you did this at all in
8 preparing your declaration.

9 A. Oh. I guess -- yeah, I was
10 trying to answer that in that I don't
11 remember whether this was a document that
12 was on my hard drive and files or someone
13 had already pulled it down or I went and
14 looked for it. I just don't recall.

15 Q. Understood.

16 If we turn back to your
17 declaration, there are a number of exhibits
18 listed on the table spreading across pages 6
19 through 9. Are there any documents in that
20 table for which you do specifically recall
21 searching for that document to determine
22 that it was published by a certain date?

23 A. Okay. The -- I am just flipping
24 back through the table for you here.

25 One that sticks in my mind, and I

1 M. BROGIOLI
2 don't know why, is the ACPI references. So,
3 I guess Ex 1029. And I remember -- and this
4 may have been for the '958 because I don't
5 recall a timeline. But I remember looking
6 online at what dates certain of the ACPI
7 documents were available and what was in
8 them.

9 I'll stop there.

10 Q. You referred to the ACPI
11 documents. Is that just Exhibit 1029?

12 A. In terms of one example that came
13 to mind, yes.

14 Q. And when you say that you
15 remember looking online at what dates
16 certain ACPI documents were available and
17 what was in them, what does that process
18 entail?

19 A. So, the same process I described
20 a few moments ago. I would be looking at
21 perhaps a Google search with a date setting
22 to say only show me things prior to 2004 or
23 2002, and then looking at those documents,
24 in this example an ACPI reference, and then
25 reading it for its content and subject

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2 matter.

3 Sometimes I have used things like
4 the Way Back Machine, which is a website
5 that can show you what was where on the
6 internet and when. I don't recall
7 mentioning that specifically in this
8 proceeding.

9 Q. So for Exhibit 1030, what is your
10 recollection of your exact process for
11 locating this document and verifying the
12 date on which it was published?

13 A. So I -- for the Exhibit 1030, I
14 don't remember the specific thing I did that
15 day. Again, I have seen this document and
16 flavors of it a number of times over the
17 past, you know, 20 years plus.

18 To the extent I am looking for it
19 online prior to this 2002 date, the process
20 I would use is exactly as I just described,
21 though. Starting out with Google, for
22 example, "Only search up to and including
23 October of 2002" perhaps, or probably the
24 filing date of the patent. And then seeing
25 this document was available prior to that,

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2 in October, it's from Intel, Intel is
3 stating this was available at this time,
4 Google is showing that as well -- that would
5 be the process.

6 Q. Okay. Thank you.

7 I think I am going to be
8 switching topics here but we have been going
9 for about an hour and I think it would be a
10 good time to just do a real short break.

11 A. Okay.

12 (Recess.)

13 Q. Dr. Brogioli, I would like to
14 talk about some of the terms that you use in
15 your declaration so I wanted to point you
16 first to paragraph 46 of your '781
17 declaration.

18 A. Okay.

19 Q. We are going to start at kind of
20 a pretty basic level. Hopefully this isn't
21 going to bore you, but -- what is a BIOS,
22 B-I-O-S?

23 A. So, it is -- I think it stands
24 for basic input/output system. In the
25 context I talk about it, it is low level

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2 firmware or code that is part of the process
3 of booting up the operating system on your
4 computer. It handles other things like
5 checking for input/output devices and things
6 like that.

7 Q. Is that how a person of skill in
8 the art in 2004 would have understood the
9 term BIOS?

10 A. Yes. And depending on if they
11 were looking at a particular or specific
12 system, they could go get pretty lengthy
13 documentation on how it might work.

14 Q. Does the prior art you relied on
15 for this IPR use the term BIOS consistent
16 with how you just described it?

17 A. As I recall, yes. Maybe to
18 answer another way, I don't recall seeing or
19 referencing anything in my declaration that
20 was inconsistent with that.

21 Q. In paragraph 44 of your
22 declaration you say that it was
23 "conventional and well known to a POSITA
24 that one of the processors in a
25 multiprocessor system would be the boot

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2 processor."

3 Do you see that?

4 A. Yes.

5 Q. What is a multiprocessor system?

6 A. It is a system -- well, there's a
7 lot of different flavors, but an example
8 would be a computer system that has multiple
9 different processing units in it. So, a
10 processor zero, a processor 1 might be an
11 example.

12 Q. And is it your opinion that every
13 multiprocessor system in 2004 included a
14 boot processor?

15 A. That this POSITA would
16 understand, in a given multiprocessor
17 system, one of these is going to be the boot
18 processor and responsible for that boot,
19 aspects of that boot process, which I start
20 to describe in the back half of this
21 sentence.

22 Q. Okay. Just looking at page 22 of
23 your declaration, I see, for example the
24 top, you identify a Schelling reference,
25 S-C-H-E-L-L-I-N-G, which you have a

1 M. BROGIOLI
2 parenthetical which says, "A common approach
3 to initialize a multiprocessor system is to
4 select a single processor as the BSP." And
5 then about halfway down you cite to a Datta
6 reference which says, in the parenthetical,
7 "a BSP is usually selected."

8 So, I just want to make sure I am
9 clear. Is the boot processor something that
10 is a common way to do it, or is the boot
11 processor something that is inherent in a
12 multiprocessor system in 2004?

13 MS. ZHANG: Objection to form.

14 A. I would say certainly the common
15 way to do it, just as these references are
16 describing, in that in a multiprocessor
17 system in 2004 there is going to be a boot
18 processor for that boot process.

19 Q. You mention or you describe here
20 kind of in the first sentence of paragraph
21 44 of your declaration the steps or, say,
22 the role of the boot processor. Is that
23 right?

24 MS. ZHANG: Objection.

25 Foundation.

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2 A. Maybe I can hear your question
3 one more time?

4 Q. You mentioned a moment ago that
5 in the second half of the first sentence in
6 paragraph 44 that you described what the
7 role of the boot processor is in a
8 multiprocessor system. You said,
9 "Initializes the system, including
10 initializing the other processors and
11 booting the operating system."

12 So, my question is: Is that the
13 role of a boot processor in a multiprocessor
14 system?

15 A. Yes. These are what this person
16 of skill would understand are the
17 conventional ways to do this, and these --
18 in the last half of the sentence I am
19 talking about things that the bootstrap
20 processor or boot processor is responsible
21 for. So it is that initializing the system,
22 initializing the other processors that are
23 present, bringing up and booting the
24 operating system.

25 Q. Okay. What is -- in the context

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2 of the art for the '781 Patent, what is
3 memory?

4 A. Typically I am referring to
5 memory as digital memory here, used for
6 storing digital information, an example
7 being like BIOS data or CPUID's are things I
8 talk about.

9 There is probably contexts where
10 I talk about it being random access memory,
11 and I think in some examples there is
12 flavors of things like read-only memory or
13 electrically erasable read-only memory.
14 Those are examples and types of things of
15 the type of memory I am talking about here.

16 Q. What is non-volatile memory?

17 A. It's a flavor of memory where the
18 information you put in it stays there even
19 if you remove the power. So, like a ROM
20 would be an example of that, or a flash
21 memory where I have data in there or maybe
22 there is code in there and maybe it comes
23 from a manufacturer or something, and what's
24 in there stays in there if I remove the
25 power, et cetera.

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2 Q. What is volatile memory?

3 A. Sort of the -- it's actually the
4 opposite thing. So, it's memory where you
5 don't have to -- I'm sorry.

6 It's memory where you'd have to
7 keep power to it, sometimes at a very high
8 rate of refresh, to keep information in
9 there. And if you don't -- if you remove
10 power from the machine or power it down
11 or shut things down, whatever was stored in
12 that memory gets lost unless you stick it
13 somewhere else, in a non-volatile memory.

14 Q. What is system memory?

15 A. Is there a place in the
16 declaration I am referring to system memory?
17 I should search for it.

18 Okay. So one example is here in
19 paragraph 121, with Fox. And Fox refers
20 to -- in this example it's system memory is
21 what's storing that BIOS. So it's BIOS
22 firmware code that can be run, and there is
23 associated data in there.

24 In this example, that's all
25 stored in a system memory that is

1 M. BROGIOLI
2 non-volatile because I can unplug my
3 computer and then plug it back into the wall
4 and start it up and the BIOS is still there
5 from before the power was removed.

6 Q. So without looking at the Fox
7 reference, if you were to ask a person of
8 ordinary skill in the art in 2004 what
9 system memory is, what would they say?

10 MS. ZHANG: Objection to form.

11 A. Another example is here at the
12 bottom where I talk about system memory and
13 storing data structures and tables and
14 things in that memory. An example a person
15 would understand is, it could be just plain
16 old RAM in the system where the operating
17 system or the BIOS is storing some of its
18 own internal data structures and things like
19 that that typically are just used by the
20 system itself rather than, say, Mike's copy
21 of Microsoft Word running on the system.

22 It's not application memory.
23 It's a system memory used by the operating
24 system or the kernel and things like that.

25 Q. That is what I was trying to

1 M. BROGIOLI

2 understand, how it is distinct from other
3 types of memory. And you said it's used by
4 the operating system as opposed to
5 application memory, which would be used by a
6 particular application. Am I getting that
7 right?

8 MS. ZHANG: Objection.

9 Misrepresentation.

10 A. I would say it's -- system memory
11 can be comprised of a number of different
12 types of memory or memory technologies. The
13 example here of what makes it system memory
14 is that it is for storing things like the
15 BIOS or the OS, data structures, et cetera,
16 that aren't things a user typically
17 interacts with.

18 And going back to the Microsoft
19 Word example or my version of Word, that's
20 application and would have application
21 memory associated with it.

22 Q. So in general, if a person of
23 skill in the art is looking at a computer
24 system and I point to a portion of the
25 memory, how would that person go about

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2 telling me whether it is system memory,
3 application memory or some other category of
4 memory?

5 MS. ZHANG: Objection to form.

6 A. So, it's -- there is kind of a
7 few degrees of freedom there. I would say
8 if I pointed to a person and showed them
9 this memory chip, non-volatile, that stores
10 the BIOS, they would consider that, okay,
11 that would be a system memory because
12 Microsoft Word isn't going to run on that
13 chip, right?

14 If I pointed them to the DRAM in
15 the computer that you might go buy at Best
16 Buy and plug into your PC, some of that's
17 going to be used for application, some of it
18 may be used for data structures and tables
19 within the OS that would be system memory.
20 So, they would maybe need to look at not the
21 fact that it is a DRAM memory module that I
22 bought at Best Buy but maybe this region of
23 the DRAM is used for the system and this
24 other part is used for Microsoft Word or
25 PowerPoint or something.

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2 Q. So application memory could
3 include some volatile memory, could include
4 some non-volatile memory; and, similarly,
5 system memory could include volatile or
6 non-volatile memory. And the distinction
7 between them is based on how the memory is
8 being used. Is that right?

9 MS. ZHANG: Objection to form.

10 A. I think maybe a more concise way
11 to answer this is, a POSITA would understand
12 system memory in this context is memory
13 being used by the computer system or -- the
14 computer system's operating system or
15 firmware or BIOS rather than a user's
16 specific application. It's the role of what
17 the memory is doing, system functions
18 versus, like, Microsoft Word, applications.

19 Q. What is a hot spare?

20 A. So, it is -- this notion of a
21 spare processor in a system where I can take
22 one processor and take the spare processor
23 and sort of interchange them, just as a
24 concept. And what's a hot spare is the
25 notion that this processor is held in

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2 reserve and can be put into -- put into
3 action, so to speak, as needed, rather than
4 Mike has to get in his car and drive to Best
5 Buy and buy another one off the shelf and
6 drive back and stick it in.

7 And there is examples that Fox
8 gives that it can remain in an idle state or
9 low power mode or what have you, but it's in
10 the system and available, available to be
11 used.

12 Q. So you mentioned that it could be
13 held in reserve. What does that mean, to
14 hold it in reserve?

15 A. In the sense that, just like Fox
16 is talking about or I am pointing to in
17 paragraph 140, it could be in a state like
18 idle or low power. So, it may not be up and
19 running, running an application or something
20 at that time.

21 Q. So in your view, is a hot spare
22 necessarily held in reserve prior to it
23 being called into duty as the spare, or
24 could it also be a processor that is being
25 used by an application at that time?

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2 MS. ZHANG: Objection to form.

3 A. Let me add some clarity to my
4 prior answer. I had said application, but
5 it's really an application running on the
6 operating system. And so it's the OS that's
7 saying, hey, this hot spare is here but I am
8 not going to be running applications on it
9 right now.

10 And that is exactly what I get at
11 here in 140. So in this context of Fox,
12 it's held in this reserve language in the
13 sense that when the OS is coming up, the OS
14 is saying, "You are the hot-spare processor,
15 I am not going to run anything on you. I am
16 maybe holding you in low power mode." And
17 if Mike is using his Microsoft Word example
18 again, that's going to run on some other
19 processor that is in an active state.

20 Q. My question is whether a person
21 of skill in the art would consider a
22 processor a hot spare if it was being used
23 by the OS to run an application or some
24 other process on it.

25 MS. ZHANG: Objection to form.

1 M. BROGIOLI

2 A. I don't recall talking about
3 references or prior art references that
4 might have contemplated what you just
5 described. Typically what a person of skill
6 would understand is the way that Fox
7 describes it here in this example. There
8 may have been some other systems or
9 publications out there that talk about
10 something differently.

11 I don't recall -- if I am
12 understanding your question, I don't recall
13 discussing prior art references that talked
14 about that.

15 Q. Right. I am not asking about
16 whether prior art references talked about it
17 that way. I am asking how a person of skill
18 would have understood the term hot spare.
19 Is it your testimony today that a person of
20 skill would not have known what a hot spare
21 is?

22 MS. ZHANG: Objection.
23 Misrepresentation.

24 A. No. A person of skill would, in
25 looking at these multiprocessor systems at

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2 the time, especially in a system that has
3 fault tolerance to be designed into it,
4 that, yeah, there is a concept of a
5 hot-spare processor that's in the system,
6 plugged in. It may actively be getting
7 power and it may be in a low power state or
8 low voltage state, but it's there and
9 available to be used.

10 Q. So would that person say that the
11 hot spare is no longer a hot spare when the
12 OS starts using it for applications to be
13 run on it?

14 A. I guess I would answer that that
15 this POSITA would understand the hot spare
16 being in perhaps an idle state or a low
17 power state, which are states where, for
18 example, in IA-32, it's not running or it's
19 not executing instructions. If at some
20 point later in time the system takes this
21 hot spare out of that low power state, for
22 example, and puts it in the active state --
23 I forget the numberings on them; it's either
24 C6 or C7 -- I'd probably need more
25 information there.

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2 But if the processor is now being
3 up and running, used by the OS, and as part
4 of that process the OS and BIOS and firmware
5 go and change BIOS data saying, "Hey, you
6 are no long a hot spare; I changed your bit
7 field because you're running Microsoft Word
8 now," a POSITA would know, in that scenario,
9 according to the BIOS the definition says
10 it's now not the hot spare because it's
11 running and its associated data structures
12 and tables have changed, I guess.

13 Q. I guess I am trying to understand
14 whether the concept of hot spare indicates
15 something about what's happening on the
16 processor. And it sounds like your answer
17 just now was focused on how the BIOS might
18 be recognizing the processor or designating
19 the processor.

20 So, my question kind of comes
21 back to the issue of how the processor is
22 being used and whether there is a way to
23 meaningfully distinguish a hot spare from a
24 processor that is not a hot spare based only
25 on how it is being used.

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2 MS. ZHANG: Objection to form,
3 foundation.

4 A. So, that question sort of gets
5 into a hypothetical of -- if I'm
6 understanding right, is just what the
7 processor is doing at an instance in time
8 defining whether it's a hot spare or not.
9 And the examples I talk about, the concept
10 hot spare ties into the notion of an
11 operating system and a BIOS and how the
12 standard or specification for those pieces
13 of software or firmware define what's a hot
14 spare and, under those conditions, what they
15 must flag, various settings in system memory
16 as to denote or not denote something being a
17 hot spare or not being a hot spare. So,
18 they are all somewhat intertwined.

19 So, I would say, in the context
20 of Fox, this POSITA understands that, okay,
21 there is this other processor here I've
22 highlighted in orange here on page 88, that
23 that processor is the one here that is going
24 to be in, quote, idle, off or in low power
25 mode, right, and it's held in that reserve

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2 as the hot spare. And the IA-32 system is
3 going to flag that in system memory
4 somewhere so that everybody else knows this
5 thing is the hot spare if we need to use it.
6 And it's that overall environment that is a
7 part of the context here.

8 I guess I will follow on with
9 that, if the question were, well, it's
10 supposed to be the hot spare and it's in the
11 state of, quote, idle, off or low power
12 mode, but then Mike goes in and sort of
13 hacks the data table and the BIOS to say
14 yeah, but the bit's 1 and says it's running.
15 What is it now? Well, that seems to be
16 outside the scope of what is defined in the
17 art.

18 Q. What is the difference between a
19 hot spare and an active spare?

20 A. So it looks like this is
21 discussed in my paragraph 200 or 201 maybe
22 for claim 6. And this is a scenario where
23 there is a spare in the system and it's
24 active in the sense that -- at the very last
25 sentence -- it would have been initialized

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2 as an active processor with a software tag
3 indicating it's a spare processor.
4 So, it's sort of that
5 infrastructure I was just talking about.
6 And in this case it is denoted as available
7 to use as a spare if something fails, but
8 it's actually running instructions or tasks
9 in this scenario.

10 Q. So can a processor be an active
11 spare and a hot spare at the same moment in
12 time?

13 MS. ZHANG: Objection to form,
14 foundation.

15 A. I guess I'd need to think about
16 that. You know, it can be an active spare
17 if it is -- you are telling the system that
18 it is denoted as a spare by setting its bit
19 with software or its tag, and it is active
20 because I am going to let it run
21 instructions.

22 If the definition of hot spare is
23 something that's available to use that may
24 be idle or in a low power state, maybe that
25 may comprise the same thing. In the hot

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2 spare scenario, it's not running
3 instructions but it would still have power
4 to it and be installed in the system and
5 available to be turned on and run tasks.

6 Q. I am not sure I understand your
7 answer. Are you viewing hot spare as sort
8 of a subcategory of active spare, or the
9 other way around, or are these two distinct
10 concepts?

11 A. What I am saying is you can have
12 a hot spare, which Fox talks about as being
13 something in the system. Perhaps it's idle
14 or in low power state with its software tag
15 indicating it's a hot spare. You can also
16 have something that is an active spare where
17 it is in the system receiving power, its
18 software tag is set to indicate it's a spare
19 processor, but in this case it is also, in
20 Fox, executing jobs or tasks.

21 I would maybe need to go back to
22 Fox and look as to whether -- they're both
23 forms of spare processor, but they have
24 different characteristics I suppose.

25 Q. Let's take a look at paragraph

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2 216 of your '781 declaration. That is on
3 page 118 of 134.

4 A. Okay.

5 Q. Here you are discussing dependent
6 claim 13, which recites, "During system
7 boot-up system firmware identifying the
8 spare processor and holding said spare
9 processor in reserve as a hot spare."

10 Do you see that?

11 A. I do.

12 Q. And here you cite to and quote a
13 portion of Fox -- sorry. I misread that.
14 You cite to a portion of Fox, in the
15 abstract, paragraph 15, paragraph 34,
16 paragraph 40.

17 Can you show me where you found,
18 in those portions of Fox, a disclosure that
19 supports your conclusion here that there is
20 a hot spare?

21 A. I can, but I don't have a copy of
22 Fox with me. If you want to send it?

23 Q. All right. That would be
24 helpful. You don't have Fox memorized?

25 A. I do not.

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2 Q. I have just put into the chat a
3 copy of the exhibit that has been previously
4 marked Exhibit 1005, which we are referring
5 to as Fox. Do you have it?

6 A. I do.

7 Q. Okay. So in your declaration you
8 cited to a couple of different portions of
9 Fox here, and I would like you to just talk
10 me through how that shows that there is a
11 hot spare.

12 A. Okay. I will start with the
13 abstract. So, about halfway down, "While in
14 that --" sorry. One sentence prior.

15 "At least one processor of the
16 multiprocessor system is initially provided
17 as a reserve (or hot spare) processor that
18 remains in an idle, off or low power state."

19 It is talking about the concept
20 of I have a processor here; it's going to be
21 in this different state. Then Fox says,
22 well, in that mode the OS or operating
23 system is prevented from initially utilizing
24 the hot-spare processor.

25 Then it goes on to talk about if

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2 there is a failure in the system or
3 processor failure, SMI or System Management
4 Interrupt code on a good processor is
5 telling the OS to stop allocating tasks to
6 the failing processor. And then it goes on
7 to have the SMI and the operating system
8 complete the initialization of that
9 hot-spare processor to start running the
10 jobs that were running on the previously
11 failing one.

12 Then I will continue to paragraph
13 15, or it may be easier for me to just do
14 Figure 1 while we are on our way.

15 So, Figure 1 shows, if you look
16 above each of the bridges 112, the
17 right-most processor in each subfigure is
18 listed as the spare processor 122.

19 Going to paragraph 15 now, what
20 15 talks about is -- I will start at the
21 first sentence. "Implementation of the
22 invention involves utilization of the
23 systems management interrupt" that I talked
24 about, SMI, so that functionality provided
25 within the BIOS of IA-32.

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2 And then it continues on to say
3 that at least one processor of the
4 multiprocessor system is initially provided
5 as the reserve -- the hot spare we just
6 talked about -- and says the same thing:
7 The OS is initially prevented from utilizing
8 the hot spare. This is going to be done by
9 the SMI code, et cetera. And then the
10 switching can occur if a processor is
11 failing and the SMI and OS move what was
12 running on the failing processor over to the
13 hot spare.

14 And over to 34. Yeah. So,
15 similar concept. So when the MP,
16 multiprocessor, is initially activated for
17 processing, one of these IA-32 processors
18 gets held as the spare. And that process of
19 holding off the spare involves using the
20 BIOS that we just talked about and
21 recognizing and setting it as the spare
22 during boot. And the BIOS responds by
23 effectively not enabling that spare
24 processor so that the result happens the way
25 we have been describing.

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2 And it continues on, the lower
3 parts of paragraph 34, to talk about the
4 software tag that we were discussing in my
5 declaration that is associated or is used to
6 identify that processor as a spare.

7 Then I guess I will go to
8 paragraph 40. Similar explanation. So,
9 Fox's implementation involves using the
10 systems management interrupt, SMI -- and
11 that's within BIOS of IA-32 -- and using
12 that functionality, one of the processors in
13 this multiprocessor system gets put in
14 reserve as the hot spare. And while in that
15 mode, the OS is prevented from utilizing the
16 hot spare. And this is because of the
17 bookkeeping that happens via the SMI and the
18 BIOS, et cetera.

19 Then lastly, when a processor
20 failure gets detected, that same SMI, System
21 Management Interrupt code runs on the good
22 processor and tells the OS, "Don't put
23 anything else on the failing one. Let's
24 start putting stuff on the hot spare and
25 we'll bring it out of being a spare when we

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2 initialize the hot spare and then begin
3 receiving the held off tasks that were
4 formerly intended for the failing
5 processor."

6 And then in the last part which
7 we were talking about a few minutes ago, the
8 control goes back to the operating system
9 and it updates the active processor list,
10 which results in effectively the OS sending
11 work -- here it says threads -- that used to
12 be targeted for the failing processor now
13 over to the hot spare.

14 Q. On the same page of your
15 declaration but a couple paragraphs down,
16 paragraph 218, here you are addressing claim
17 14, which recites "during system boot-up
18 system firmware booting the spare processor
19 as an active spare."

20 Do you see that?

21 A. Yes.

22 Q. And in paragraph 218, you also
23 cite to paragraph 15 of Fox, which you just
24 discussed with me, and paragraph 34 of Fox,
25 which you just discussed with me.

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2 Are you pointing to the same
3 processor here for claim 14 as you did for
4 claim 13?

5 A. So the claims 13 and 14 are
6 different, right? There is differentiation
7 there. And the cites I am pointing to are
8 the same passages in Fox and that same
9 system of -- involving the OS and the System
10 Management Interrupts and the BIOS and the
11 tags that are set denoting hot-spare
12 processors and active processors.

13 Q. So, for example, we looked at
14 Figure 1 a moment ago and you identified
15 IA-32 spare processor 122 in Figure 1 of the
16 Fox reference as an example of a hot spare.
17 Right?

18 A. That's correct, yes.

19 Q. Is IA-32 spare processor 122 in
20 Figure 1 of Fox also an example of an active
21 spare?

22 A. In the sense that Fox talks about
23 the hot spare and the active spare, I think
24 this spare processor illustrated in Figure 1
25 is an illustration of what could be both of

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2 those things that Fox talks about.

3 Q. So which disclosure in Fox
4 indicates, separately from the disclosure
5 that this could be a hot spare, that this
6 processor could be an active spare?

7 MS. ZHANG: Objection to form,
8 foundation.

9 A. So, one example I think is here
10 in the last two sentences of paragraph 40.
11 So I will read them and I guess have some
12 comments as I go.

13 So it says, "Contemporaneously
14 the SMI and OS activates and completes an
15 initialization of the hot-spare processor to
16 prepare it to begin receiving the held off
17 processes." So, those are the held off from
18 the one that is failing.

19 Control goes back to the OS and
20 it updates that active processor list. So,
21 this hot-spare processor is now flagged as
22 active. It's running the stuff that it used
23 to run on the failing processor, and those
24 jobs or threads, as Fox said, run on the
25 active one.

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2 And the last portion says "which
3 updates the active processor list and
4 allocates the threads that were running on
5 the failing processor to the hot-spare
6 processor." So that, to me, the hot spare
7 is an active spare now.

8 Q. Are you saying that when the SMI
9 and the OS activate the hot spare, it
10 becomes an active spare?

11 MS. ZHANG: Objection.

12 Misrepresentation, foundation.

13 A. That's one aspect of what Fox is
14 describing. And what I am saying in my
15 paragraph 218 is that a POSITA would know
16 that during the bring-up, instead of keeping
17 it as a hot spare that is idle, make it just
18 do what Fox just said and make it an active
19 spare and it can run things rather than
20 sitting in the idle state.

21 Q. When you say it can run things,
22 are you referring to running the threads
23 that were running on the failing processor?

24 A. Not quite. I am talking about
25 running the threads or threads that Fox

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2 talks about. There may not be, here, a
3 scenario of something failing or failing yet
4 because in my paragraph 218 this processor
5 is set as an active processor on boot and so
6 once boot is done, it starts running
7 threads.

8 Q. So where is the disclosure in Fox
9 that shows that the processor that you are
10 referring to is set as an active processor
11 that is running threads?

12 MS. ZHANG: Objection.
13 Foundation.

14 A. It's in these paragraphs that we
15 have been discussing and that I cite in 218,
16 in that a POSITA knows, just set it as your
17 hot spare and active during boot, set the
18 right bits with the SMI, et cetera, and just
19 do it at that point. And then once
20 everything boots up, you run threads on it
21 rather than -- instead of just waiting for a
22 failure and then setting the bits and
23 running things, running threads on it.

24 Q. I am not sure I understood that
25 answer because I was asking for a specific

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2 disclosure in Fox. Can you point me to
3 something specific that discloses this?

4 A. Yeah. So I will take us back to
5 paragraph 40. If you remember, in this
6 paragraph we have a hot-spare processor.
7 And then the last sentence or last two
8 sentences, it says, hey, now we are going
9 to acti -- sorry -- update the active
10 processor list to reflect that the hot spare
11 is active, and now the OS is going to
12 allocate threads to the active hot spare.

13 And so a POSITA would know, okay,
14 that's exactly what I need to do for claim
15 14, just on boot set this thing as the
16 active spare and run threads on it like
17 everything else once boot is complete.

18 Q. Is there something in paragraph
19 40 that indicates that the activation and
20 initialization of the hot spare and the
21 update of the active processor list is
22 occurring during system boot-up?

23 A. I would say the scenario
24 described in paragraphs 15 and, I think it
25 is, 34 and 40. What I was just discussing

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2 in 40 is Fox talking about doing this
3 process in response to a failing processor.
4 Fox talks about, in various other places,
5 things that go on during boot and system
6 boot and all of that, a couple of the
7 different claims.

8 As I say in my paragraph 218,
9 that's exactly what a POSITA would
10 understand: Just do this during system boot
11 and that's what the active spare is, or
12 that's what claim 14 of the patent is in the
13 active spare.

14 Q. So you have cited in paragraph
15 218 two paragraphs of Fox, right, paragraph
16 15 and paragraph 34. Is that right?

17 A. It is. And as we are discussing
18 this now, I think it seems to me that
19 paragraph 40 is related to the same concept.
20 Perhaps I should have put that -- that
21 should have gone with the footnotes that are
22 in 218. That may have been an oversight on
23 my part.

24 Q. So which concept is it that you
25 think would have been more clear from

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2 looking at paragraph 40 than looking at the
3 paragraphs that you cited in your paragraph
4 218?

5 MS. ZHANG: Objection to form.

6 A. I wouldn't say any is more
7 relevant than the other. Even in 15 the
8 same concepts are presented with just
9 slightly different language. It says, sixth
10 line from the bottom: "Contemporaneously,
11 the SMI and OS activates and completes
12 initialization of hot-spare processor to
13 prepare to begin receiving the held off
14 processes."

15 That's exactly what we are
16 talking about. A POSITA just does that
17 during system boot.

18 Q. So you are not saying there is
19 specific disclosure in any of these
20 paragraphs that you cited for Fox, including
21 paragraph 40 that you said maybe you should
22 have cited, where this process of activating
23 the hot spare is done during system boot-up;
24 right?

25 MS. ZHANG: Objection to form.

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2 A. That is not entirely accurate.

3 If we go back to 34, Fox is talking about
4 exactly what is going on during the boot
5 process, right? Second line down: "Holding
6 off the processor involves having the BIOS
7 recognize the processor as a spare during
8 BIOS boot," and it's doing self test of the
9 system. But this is part of the overall
10 boot process.

11 And so again, a POSITA is reading
12 15 and 34 and maybe 40 -- maybe they don't
13 even need to get that far -- and saying,
14 "Okay, it's telling me how to set up spare
15 processors of various types and you do it by
16 either SMI or you can do it during BIOS.
17 And here we're in BIOS boot, so just do it
18 now."

19 Q. But you are not saying that the
20 process of setting up the processor as a
21 spare during BIOS boot is what boots the
22 spare processor as an active spare, are you?

23 A. What I am saying is this section
24 is saying, hey, during this phase of the
25 computer coming to fully operational, let's

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2 say, using the BIOS during the boot process
3 to set one of these as a spare processor and
4 set its tag to active and then, just like
5 everything else, once boot is complete and
6 the OS -- OS and applications start running,
7 then those jobs or threads that Fox talks
8 about get issued to and run on that active
9 spare that was set up during the boot time.

10 Q. Earlier you said that this
11 processor would be set up as a hot spare and
12 it would be idled, so I am having trouble
13 understanding how the same processor is both
14 idled when it is set up and listed as active
15 when it is set up. So, I am missing
16 something. Can you help me understand the
17 difference?

18 MS. ZHANG: Objection to form,
19 foundation.

20 A. So the difference is that the --
21 as Fox describes in 15, 34 and 40, during
22 the boot time I can set this processor here
23 as hot spare and it's idle or it's in low
24 power state, and I am not -- the OS is not
25 issuing the threads to it. It still remains

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2 a spare processor, but now the SMI, the OS,
3 et cetera, or BIOS can go in and set the bit
4 or set the tag that says you are on the
5 active processor list now.

6 When the OS sees that as part of
7 the infrastructure, it starts issuing those
8 threads to the processor, not from a
9 failing -- we don't have a failure in the
10 scenario, but the system sets it to active.
11 It is still spare, but now it is taken into
12 low power state, put into full active state
13 and threads from my Microsoft Word start
14 running on it.

15 Q. So where does Fox disclose this
16 concept of taking a processor out of a low
17 power state into an active state when there
18 is not a failure that preceded that?

19 MS. ZHANG: Objection to form,
20 foundation.

21 A. It's in these paragraphs 14 --
22 sorry -- 15 and 34. Fox tells you how to
23 take the processor from being a standby and
24 in a low power state and going active, and
25 it adds to the active processor list that

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2 the OS then issues threads to. And Fox
3 talks about in numerous places this whole
4 boot process. And so a POSITA
5 understands -- to your question -- rather
6 than wait for the failing processor to go
7 add this processor to the active list, we
8 are already here in the BIOS in 34; just add
9 it to the active list now.

10 Q. In what sense then is that
11 processor that is added to the active list
12 in the BIOS an active spare processor?

13 MS. ZHANG: Objection to form.

14 A. Can I hear your question again?

15 Q. You said that the processor would
16 be added by the BIOS to the active list.
17 Once it's added to the active list, why is
18 it considered a spare processor?

19 A. Because that's what Fox says. He
20 says, at least the one example in paragraph
21 40, in the last sentence, "Control is then
22 returned to the OS, which updates the
23 'active' processor list and allocates the
24 threads," dot dot dot, "to the hot-spare
25 processor." So it's still considered a hot

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2 spare. It's added to the active list and
3 the OS then issues threads to it.

4 Q. So are you saying that that
5 processor is still a hot-spare processor and
6 now that it's been added to the active list
7 is also an active spare?

8 A. That seems to me the language
9 that Fox is using.

10 Q. Is that your understanding of
11 Fox?

12 A. Yeah. That's what he is saying
13 and that is why these sequences of
14 paragraphs are what show both -- taking us
15 back to my declaration -- what is both
16 dependent claim 13 and dependent claim 14.

17 MR. LINDNER: We are at another
18 hour. I have been drinking too much
19 water here so I need a quick break.

20 (Recess.)

21 Q. Dr. Brogioli, we talked earlier
22 today about the IA-32 document that was
23 Exhibit 1008. That document is quite a long
24 one so I am not going to ask you to tell me
25 everything that is in there, but I do want

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2 you to give me just a short sort of overview
3 of what that is.

4 A. I am just skimming the table of
5 contents again myself. (Pause.)

6 So the easiest way, without a
7 30-minute answer, is I will just, high
8 level, go through the table of contents.

9 So, it's a system programmer
10 guide so it is intended for a lot of people,
11 people doing OS, BIOS, that kind of thing.
12 It starts about the system architecture, how
13 flags and fields work in chapter 2.

14 Chapter 3 is a certain mode that
15 the memory system can operate in and how you
16 deal with that.

17 Chapter 4 is about protection.
18 So without too much info, what the OS can do
19 or not do depending on various modes of
20 operation.

21 Five talks about different
22 interrupt systems.

23 Six is task management, which
24 looks like the OS moving tasks or things
25 like those threads we talked about earlier.

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2 And then 7 is a whole lot about
3 multiprocessor management, tables that are
4 used.

5 It looks like 8 is about the
6 interrupt controller and managing processors
7 and things like that. There is some other
8 stuff about the instructions set and various
9 other management aspects.

10 Q. Okay. Thank you.

11 Before we go forward I just
12 wanted to confirm, did you communicate with
13 counsel during the break regarding the
14 substance of your testimony?

15 A. No, we did not.

16 Q. So, if we were to ask a POSITA to
17 describe kind of the main parts of a system
18 that is based on this IA-32 architecture,
19 what would that include?

20 A. I think it would be concepts that
21 are present in this table of contents that
22 we talked about. There is a huge amount of
23 subject matter both in this reference and in
24 the complexity of IA-32. So, depending on
25 their focus, they may focus on one area more

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2 than another, but it would generally be the
3 concepts reflected in this type of document.

4 Q. So we are talking about a
5 processor, right?

6 A. That's right.

7 Q. And that's -- sorry. These
8 are -- again, these are the questions that
9 put you to sleep. I'm just talking about
10 kind of very basic level.

11 We are talking about a processor
12 that would be put into like what you would
13 sort of call a normal computer system; is
14 that fair?

15 A. I think so, yeah. At the time,
16 desktop computers or servers or things like
17 that.

18 Q. And then that would have -- the
19 system itself would have various kind of
20 standard components typically, right?

21 A. In the sense of -- right. It
22 would have a certain kind of hard drive or
23 it might have DDR2 memory or DDR1 or
24 something like that. Stuff like that.

25 Q. Okay. So this isn't necessarily

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2 like some kind of a specialized processor
3 that's only made for a certain very specific
4 application; it is kind of general purpose.
5 Right?

6 A. I think that's fair. That's a
7 phrase I would use. These were generally
8 used as general purpose processors.

9 Q. So the OS is running on the
10 processor in a system like this, right?

11 A. As a concept, yes.

12 Q. And then that processor interacts
13 with these other components of the system,
14 right?

15 A. The -- the OS will interact, the
16 BIOS will interact. There is probably
17 aspects of the processor interacting with
18 other parts of the processor -- like how
19 signals happen and interrupts -- is probably
20 a more accurate way to say it.

21 Q. Okay. Then the OS would have
22 access to things like -- I think you
23 mentioned memory, RAM? Those kind of
24 things?

25 A. That's right.

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2 Q. How does the OS utilize RAM?

3 A. In probably a lot of different
4 ways. But there is different parts of the
5 OS that may store its own internal data and
6 variables and things in the RAM to load and
7 store and remember things. Tables and
8 things like that.

9 Q. So I know you mentioned that in a
10 computer system like this you can have, you
11 know, RAM that you add to it. You go to
12 Best Buy and you get those chips and you add
13 that into the system, right?

14 A. Right. That's one thing you can
15 do, assuming you have got a motherboard that
16 has slots for it and that kind of thing, but
17 yeah.

18 Q. Right. If you took out all the
19 RAM, then what would happen to the system?
20 Would it be able to function without it?

21 A. I am trying to answer the
22 question without weird things I've done for
23 hobbies in the past. But I think what the
24 intention is, if the motherboard doesn't
25 have any RAM or let's call it memory module

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2 stuck into the board, there is probably
3 something in BIOS or power-on self test that
4 says, hey, there is nothing here, and it
5 prevents the next steps from happening.
6 Maybe there is a beeping sound that would
7 play, you know, many years ago. And the
8 system probably wouldn't boot.

9 Q. Okay. So I wanted to talk a
10 little about the Landry reference. I am
11 going to put that into the chat in just a
12 moment here.

13 I have just uploaded to the chat
14 the exhibit marked previously as
15 Exhibit 1011. We can call that Landry for
16 today.

17 A. Okay.

18 Q. So I wanted to just quickly talk
19 about what problem this Landry reference was
20 trying to solve and I would like to point
21 you to page 6 of 9. This would be column 1,
22 the paragraph starting around line 63.

23 Can you -- you don't have to read
24 out loud, but just take a look at that
25 paragraph and let me know what you think the

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2 problem is that Landry was trying to solve.

3 A. So it looks like, at least in
4 this paragraph starting at line 63, Landry
5 is talking about some time back, for an
6 operating system called DOS and applications
7 that ran on that operating system, that some
8 of those would need one of the CPU's to be
9 designated as the CPU0.

10 It talks a little about what that
11 CPU does in the system around DRAM refresh,
12 which is one of the volatile memories we
13 talked about this morning, and makes some
14 other comments about some or most
15 multiprocessor systems require one of the
16 processors to be CPU0--

17 (Reporter interruption.)

18 A. -- one of the processors to be
19 designated as CPU0 and that may need to be
20 in a particular physical location.

21 That's generally what this
22 paragraph talks about.

23 Q. And do you see right after the
24 sentence you read it says, "If one of the
25 CPU locations is always designated as

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2 containing CPU0, however, the slot may be
3 empty or the CPU may fail, crippling the
4 entire system"?

5 A. I do. And the context here is,
6 Landry is talking about this in his
7 background of the invention section, so
8 these were things that had been going on
9 prior to Landry.

10 Q. You also see that, just above
11 where you started at column 1 line 56, it
12 says, "If the first microprocessor does not
13 function properly, however, it cannot turn
14 on the remaining processors and the entire
15 system is left incapacitated. Consequently,
16 the computer owner or operator has a
17 computer system with one or more operational
18 CPU's but, ironically, the system is useless
19 until the repairman arrives."

20 Do you see that?

21 A. I do.

22 Q. I suppose Landry is old enough
23 where the concept of a repairman to come and
24 fix computers might have been relevant.

25 A. We used to have a Sun guy that

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2 would come fix the box on campus 25 years.

3 Q. So it's fair to say that Landry
4 is trying to avoid the situation where you
5 have got a useless system or a crippled
6 system as a result of one of the processors
7 having a problem, right?

8 A. I would say, in his background
9 section, he is talking about the scenario of
10 one of these processors is missing or not
11 functional but you have all this functional
12 computer and hardware and you can't boot the
13 thing up because this one thing, this one
14 CPU isn't working right. So, that's just in
15 his background.

16 The rest of the reference talks
17 about the notion of assigning one of those
18 good functional CPU's as a logical -- that
19 CPU0 he referenced -- to boot up the system
20 and continue on.

21 Q. Okay. So in the case where you
22 have a fixed CPU designated as the boot
23 processor, Landry is contemplating that if
24 that processor fails, then the other
25 processors don't even get turned on; right?

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2 A. That in the pre-Landry days, if
3 you have got fixed -- as in a fixed,
4 designated CPU0 that's in a fixed slot and
5 that CPU is functionally broken or if it's
6 missing, the other CPU's that are presumably
7 still good can't ever get booted up and so
8 you are just stuck.

9 Q. Okay. So you are just kind of
10 trying to boot, can't do it, the whole thing
11 sort of stalls and you never get to runtime.
12 Right?

13 A. In that scenario in his
14 background section, that's what is going on;
15 yes.

16 Q. So in line -- sorry. Column 2,
17 line 20, Landry says, "If the CPU functions
18 properly, the CPU is designated as CPU L0
19 and the microprocessor retains this
20 designation until the system is power
21 cycled."

22 Do you see that?

23 A. Yes.

24 Q. When it says that it retains the
25 designation until the system is power

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2 cycled, what does that mean to you?

3 A. Let me just read the whole
4 paragraph first. (Pause.)

5 Okay. So, this is in the summary
6 of Landry's invention, and so in the first
7 part he talks about where CPU's may
8 physically sit. And then starting around
9 that line 18, the processor in physical
10 location zero goes through its -- it's
11 called power on self-test or post --
12 basically checking, is everything around me
13 working right?

14 If that is all satisfied, that
15 CPU gets designated as the logical CPU L0.
16 And then the other CPU's come out of their
17 state and everything boots up.

18 And I believe what he is saying
19 here is that -- so maybe it wasn't CPU0;
20 maybe it was the CPU in physical slot 1 that
21 passed his test, and that gets designated as
22 the CPU L0. But the system only retains
23 that information until you what's called
24 power cycle -- you power down and reboot the
25 system or maybe the plug gets yanked out or

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2 something -- because in that scenario you
3 are going to go back through the
4 self-testing to boot things back up and
5 maybe the results are different.

6 Q. Okay. So in Landry, the
7 designation of which processor is CPU L0
8 does not persist when the system is
9 rebooted, right?

10 A. I think that sounds right in the
11 sense that in this reboot scenario -- what
12 is it? Old language of like soft boot
13 versus hard boot. It would be in a boot
14 scenario where all these CPU's go back
15 through their post self-test; so, yes, it
16 wouldn't persist through that process.

17 Q. Okay. And we talked about how,
18 sort of pre-Landry, this problem where the
19 designated CPU0 has a failure, you get stuck
20 and now, without a boot processor, kind of
21 nothing else can happen. So Landry says
22 here's a way to solve that: Let's -- if you
23 get to that scenario, let's -- it says "If
24 CPU P0," which I think refers to physical
25 slot zero, "is not functioning properly, it

1 M. BROGIOLI
2 is designated as inoperative. The system
3 then wakens CPU P1, repeats the process of
4 testing. If CPU P1 is operational, then it
5 is designated as CPU L0 and it boots the
6 remainder of the system."

7 So, that is kind of what you were
8 describing, right?

9 A. Right. That it's -- if one of
10 the physical CPU locations is failing, we
11 try the next one and keep going with the
12 hopes of eventually we get a good one and
13 then we boot the rest of the system.

14 Q. Okay. So instead of stalling,
15 like what would have happened if you didn't
16 have that flexibility to switch the
17 designations, now the next processor or the
18 next one that is identified as one that
19 works sort of picks up and carries things
20 all the way through so that we actually get
21 to runtime. Right?

22 A. That's right. The one that
23 passes tests and, quote, works gets your L0
24 designation. And then the hopes are that
25 you bring the rest of the system up with the

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2 other CPU's.

3 Q. Okay. So, in your declaration --
4 let me get to the right paragraph here.
5 Give me a moment. We are still sticking
6 with Landry, so you can keep that on your
7 mind here for a moment.

8 So I want to go to it looks like
9 page 82 of your '781 declaration. That
10 is -- well, hang on. Let me get this right.
11 It's page 91 of 134, paragraph starting at
12 147.

13 A. Okay.

14 Q. So, I want to understand how --
15 what you are saying in this section is that
16 you would modify -- you would modify sort of
17 the baseline Fox IA-32 system by
18 incorporating some of these techniques from
19 Landry. Is that kind of a fair summary of
20 it?

21 A. Let me take a second to look at
22 the paragraphs. (Pause.)

23 That sounds generally right. If
24 Fox is this IA-32 system and Landry is a
25 fault-tolerant boot process, this POSITA

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2 would know that you would integrate this
3 fault-tolerant boot process of Landry and
4 its CPU0 into Fox to get the fault-tolerant
5 boot process aspect.

6 Q. So Fox already has a mechanism
7 for designating the boot processor, right?
8 You say that in the second sentence here, I
9 guess, the sentence beginning "Indeed Fox's
10 multiprocessor system" in paragraph 147?

11 A. Yes. The IA-32 system has the
12 multiprocessor initialization protocol in
13 it.

14 Q. So how does that initialization
15 protocol determine the boot processor in
16 Fox?

17 A. So I think we would need to look
18 at the -- if you are looking into specifics
19 of the multiprocessor boot of Fox, we have
20 to look at the IA-32 reference on that boot
21 process specification.

22 Q. Okay. So Fox, you are saying,
23 doesn't go into detail as to how a -- as to
24 how a processor is assigned the role of boot
25 processor. Right?

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2 A. Fox goes into it in that he tells
3 you this is IA-32. And if we jump back to
4 Exhibit 1008, which is our IA-32 Intel
5 reference, it says -- I guess I am on page
6 31, but it says go to Appendix C.

7 This is the MP Initialization For
8 P6 Family Processors. It says, "Gives
9 examples of how to use the MP protocol to
10 boot P6 family processors in -- " It says
11 "N," the letter N, but it should say "in an
12 MP system."

13 Q. Okay. Is this where we get into
14 the BSP flag?

15 A. I would imagine that this
16 Appendix C talks about various flags and
17 things that you set or have to set to be in
18 accordance or compliance with what this
19 specification teaches.

20 Q. Okay. So when we are now
21 modifying Fox with Landry, as you are
22 suggesting in Ground 2, which aspects of Fox
23 are being changed here to now incorporate
24 the way that Landry does it as opposed to
25 how Fox does it?

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2 A. So I will go back to this quote I
3 just read from IA-32 manual. And it says,
4 "This Appendix C gives us an example of how
5 to use the MP or multiprocessor protocol to
6 boot."

7 So, you take Fox's -- I'm sorry.
8 You take Landry's disclosure of you're
9 trying to test each of the processors and
10 then getting a good one that passes test and
11 making that your logical L0 and booting from
12 there, and you go implement that just as he
13 describes. In the boot process it's the
14 IA-32 Appendix C, which is what Fox uses
15 because it's IA-32.

16 Q. So Landry has that particular
17 mechanism of like designating certain
18 processors as zero and even going into CPU
19 L0, logical versus physical. It seems like
20 Fox is kind of describing a different,
21 probably more advanced and came several
22 years later process.

23 I am just trying to understand
24 how those are actually going to fit
25 together. Can you go through that in a

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2 little bit more detail?

3 A. Sure. So, I have Fox. Fox needs
4 to boot its IA-32 system, and so there's the
5 boot mechanism that Intel teaches you how to
6 do. And presumably, that's implemented in
7 like low level assembly code. It runs the
8 IA-32 instruction set.

9 And so then my POSITA goes and
10 looks at Landry and says, "Well, this is
11 this fault-tolerant boot process that's even
12 better because if one of the CPU's is not
13 passing the test, the other still is and I
14 can still boot the thing."

15 So, he takes that approach of
16 self test and designating the passing one as
17 L0 and implements it in the assembly
18 instructions for the boot process of IA-32
19 that Fox is already using.

20 Q. So are there -- in that kind of
21 system where you have modified Fox, are you
22 still using the BSP flag to designate the
23 boot processor, or is that replaced in your
24 sort of combination with how Landry is doing
25 it?

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2 A. So I am jumping back to our IA-32
3 system, Exhibit 1008, and I went to Appendix
4 C, which starts on page 751 of 798. And in
5 section C.2, it's the MP initialization
6 protocol algorithm, and it's talking about
7 some of these resets and tests that happen.
8 And it talks about BIST, which is a built-in
9 self test.

10 In step 4 it talks about the
11 processor selects itself as the BSP, sets
12 the BSP flag in various APIC registers.
13 That's the IA-32 APIC BASE MSR.

14 And so our POSITA takes Landry
15 and implements it in the steps here using
16 the BIOS and various registers. There's
17 probably some, I would think, degree of
18 freedom as to how they want to go implement
19 that. But this is where they would do it.

20 Q. So I was wondering whether that
21 BSP flag is still used or whether that gets
22 replaced by something from Landry.

23 A. I don't know that I have really
24 thought through that level of implementation
25 detail. I will say that the Intel

1 M. BROGIOLI
2 specification here tells you a number of
3 aspects as to how the BSP operates and how
4 these flags operate. And so the POSITA
5 implements Landry here.

6 If they want to do it in a manner
7 that's compliant with, within the bounds of
8 this 800-page document, there would probably
9 be things that they needed to ensure they
10 didn't violate in their modification. But
11 that's how they would do it.

12 Q. Is IA-32 architecture designed
13 for DOS?

14 A. You can run DOS on it. I don't
15 know that it was necessarily designed for
16 that, but I guess in terms of maybe
17 backwards compatibility there is legacy
18 support for things in there.

19 MR. LINDNER: I wanted to turn
20 now to -- actually, before I do that, I
21 know it has been a little less than an
22 hour but it is coming up on 1 p.m. your
23 time. Before I switch gears, is this a
24 good time for a lunch break?

25 THE WITNESS: Sure. That works.

1 M. BROGIOLI

2 MR. LINDNER: Let's go off the
3 record.

4 (Recess.)

5 BY MR. LINDNER:

6 Q. Good afternoon, Dr. Brogioli.

7 A. Good afternoon.

8 Q. I wanted to ask you a little bit
9 more of a background question here. Let me
10 point you to paragraph 120 of your '781
11 declaration.

12 Are you there?

13 A. Yes.

14 Q. You refer here to something
15 called an ACPI table in Fox. Can you tell
16 me what that is?

17 A. So, at different points this
18 morning we talked about either the words
19 "having tags" or "saving data" regarding
20 some of these processors. And so this is
21 one example of that, where ACPI is Advanced
22 Configuration and Power Interface, if I am
23 remembering right. Its a fancy way of
24 saying firmware that is sort of a more
25 modern version that came out 25 years ago

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2 versus legacy stuff.

3 And within this ACPI framework or
4 firmware, there are what's called tables in
5 there that you can use to store values of
6 different type of system information.

7 Q. Is an ACPI different than an
8 APIC, A-P-I-C, ID?

9 A. So, APIC is actually a physical
10 thing. It's an Advanced Programmable
11 Interrupt Controller, which also has
12 information associated with it, as I recall,
13 around CPUID's. I'd have to go back into
14 the ACPI specification to see kind of where
15 and how that's discussed in there.

16 Q. We were looking at Landry before
17 lunch and that was a much older system,
18 right?

19 A. Landry is older. It's from 1992.

20 Q. So Landry doesn't use ACPI tables
21 or logical APIC ID's for its process of
22 designating processors based on, you know,
23 their functions?

24 A. So the ACPI is a flavor of
25 firmware that at the time, late nineties, I

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2 think associated with IA-64, was sort of a
3 more modernized flavor of some of the early
4 legacy stuff from the 80's or 90's we were
5 still carrying around.

6 So, Landry would pre-date the
7 ACPI version of firmware, but it still
8 discussed doing these things and putting
9 things in firmware and tracking these
10 values, just in the earlier version of how
11 we did things.

12 Q. Okay. So when you are combining
13 Fox with Landry and modifying Fox to include
14 Landry's technique for handling failures in
15 the boot processor, you would implement
16 Landry's technique for naming or designating
17 the processors as opposed to continuing to
18 use the ACPI table or the APIC ID from Fox
19 that play a similar role there. Is that
20 right?

21 MS. ZHANG: Objection to form.

22 A. I would answer that that -- so
23 Fox talks about ACPI as you just mentioned.
24 Yes, Fox. So if that is already the
25 firmware system for IA-32 that Fox is using,

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2 a POSITA would implement the Landry
3 algorithm in that framework. And there's
4 custom language within ACPI developers can
5 use to write their algorithms of things.

6 Q. How does that work with Landry
7 and the designations it makes between CPU L0
8 and CPU L1 and so on?

9 A. The POSITA just implements that
10 and uses ACPI tables to store the values of
11 what's in the physical or logical for CPU01.
12 And you can associate data fields and flags
13 and values with them as needed.

14 So if I go back to paragraph 120,
15 about halfway down I talk about "a POSITA
16 would have understood that in an IA-32
17 multiprocessor system --" Fox, that we've
18 been talking about -- there's
19 identifications and software flags for
20 processors, boot processors, spare, and
21 storing those in registers and tables to do
22 that bookkeeping and implement the system
23 with Landry.

24 Q. I wanted to direct you to just a
25 little down from where you were just

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2 reading. Paragraph 122 of your '781
3 declaration.

4 A. Okay.

5 Q. So, at the end of this paragraph
6 here, kind of the grand finale is your
7 statement that "a POSITA would have found it
8 suitable to store Fox's register or table
9 that stores information assigning the roles
10 of boot and spare processors in its system
11 memory, like in Arai."

12 Do you see that?

13 A. I do.

14 Q. So, in Arai the register or table
15 that is storing this kind of information
16 regarding the roles of the processors is
17 stored in RAM, right?

18 A. That looks like Arai says the
19 table is stored in main memory and, in
20 parens, data storage. So it would be some
21 kind of randomly accessible memory.

22 Q. So you are just saying that you
23 take Fox, Fox has these tables, we look to
24 Arai; Arai says put them into RAM, so Fox is
25 going to do the same thing when you combine

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2 them?

3 A. So, I will start us at 121 to
4 answer the question. So, Fox says we have
5 got system memory and we have got system
6 memory for storing the BIOS. And then we
7 talked about, specifically, registers and
8 tables. And Fox doesn't say that registers
9 and tables are stored in system memory, but
10 Arai does.

11 And so you take Arai, and it says
12 hey, the BIOS, when it runs, creates these
13 tables in memory and so that is where we are
14 going to store these values.

15 Q. Okay. So basically Fox is going
16 to do it the same way that Arai does it?

17 A. In the sense that those tables
18 will be stored in some system memory; yes.

19 Q. Is there a sense in which it
20 wouldn't do the same thing as Arai when you
21 are saying "like Arai"? I am not following
22 it here.

23 A. Oh, no. I think what I am saying
24 is that Fox will take these registers and
25 tables that are used for tracking

1 M. BROGIOLI

2 information around boot and spare processors
3 and store them in the system memory, just as
4 Arai has talked about that.

5 Q. Okay. So you are not saying you
6 would deviate from the way Arai does it when
7 you implement Arai's technique in Fox; you
8 are just saying that you are going to do it
9 the way Arai does it. Is that right?

10 A. In the sense of where you are
11 putting the information in Fox about these
12 boot processors and spare processors. You
13 are just putting it in the system memory,
14 the same as Arai. I don't recall talking
15 about deviating from that aspect.

16 Q. Okay. So you wouldn't -- you are
17 not trying to add another change to the
18 techniques that are disclosed in Arai? You
19 are not trying to do something different
20 than what Arai does, which is putting it in
21 its -- what do they call it? Putting it in
22 its -- there was another word there. Arai
23 is putting it in RAM but they called it main
24 memory or something like that.

25 You are basically -- I just want

1 M. BROGIOLI
2 to make sure I am clear on how these are
3 being combined. Arai says put the tables
4 into RAM. You have got these tables in Fox;
5 you need to put them somewhere. You take
6 Arai's teaching that says put them into RAM,
7 you combine that without -- you're not
8 changing anything; you are combining it like
9 that and using it in Fox. Right?

10 MS. ZHANG: Objection to form.

11 A. I am reviewing the paragraph.

12 (Pause.)

13 A. Yes. So Fox is again talking
14 about having the system memory, which I
15 think you were saying RAM, but I believe it
16 is randomly accessible. And Fox says, hey,
17 I'm storing it in my BIOS here. But now Fox
18 needs to deal with the process of register
19 or tables. And so it takes Arai's
20 disclosure of the tables go in the main
21 memory, and so we are going to use that in
22 Fox here.

23 Q. Okay. So the main memory in Arai
24 is what it calls this random access memory,
25 right?

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2 A. I see that I think -- the
3 language I am seeing is system memory --
4 system memory, and putting these tables,
5 ACPI tables or MP tables, into the main
6 memory that Arai uses in his language.

7 In terms of whether or not that's
8 randomly accessible, I don't see -- I don't
9 have Arai in front of me, but I don't see I
10 am talking about that one way or another in
11 my declaration.

12 Q. Did I not put Arai in the chat
13 yet?

14 A. I don't think so.

15 Q. Let me drop that over. Sorry. I
16 am asking you to go off memory here and I am
17 sure that's not fair.

18 (Pause.)

19 A. While you are doing that, in
20 paragraph 123 I continue talking about this
21 combination we have been discussing and I
22 point to, this third line down, "See IA-32,
23 (saving ACPI and MP tables in RAM)." So,
24 that would be randomly accessible, which was
25 I think the word you used.

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2 Q. Okay. That is what I thought,
3 and I just wanted to make sure we were clear
4 there.

5 Just to finish what I was asking
6 you a moment ago when you said you hadn't
7 seen Arai, I just put it into the chat,
8 Exhibit 1007.

9 A. Okay.

10 Q. I will jut point you to -- to
11 make sure we are clear on this, I will point
12 you to page 10 of 12, at paragraph 21 of
13 Arai. About five lines up from the bottom
14 it says, "The BIOS creates a table in the
15 main memory (RAM) during start-up."

16 A. I see that.

17 Q. And then it also says one value
18 of the table is identified as an ACPI MAPIC
19 table. Right?

20 A. Yes.

21 Q. So this is kind of consistent
22 with what you just noted in paragraph 123,
23 that when you combined Fox with Arai, that
24 meant you were going to put the register or
25 table that Fox uses for identifying each

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2 processor's operational state into RAM.

3 Right?

4 A. That sounds correct, yes.

5 Q. I want to go to page -- let me

6 give you the paragraph number. So,

7 paragraph 198 of your '781 declaration.

8 A. Okay.

9 Q. In this first sentence it sounds
10 like kind of what we just read. In effect,
11 you refer back to limitation 1B that we were
12 just looking at. Here you say, "A POSITA
13 would have found it suitable, routine and
14 ordinary to store Fox's register or table
15 that stores information assigning the roles
16 of boot and spare processor in its system
17 memory (data storage), like in Arai."

18 Right?

19 A. That's right.

20 Q. And we talked just a moment ago,
21 with almost the same language in paragraph
22 122, that what you were referring to there
23 is using Arai's technique of storing this
24 register or table into RAM. Right?

25 A. I lost track because I was

1 M. BROGIOLI

2 reading the paragraph. Can I hear the
3 question again?

4 Q. When we talked just a moment ago
5 about paragraph 122, which had essentially
6 the same language as is the first sentence
7 of paragraph 198, you said that what Arai
8 teaches and how you are combining Fox and
9 Arai is to store the register or table from
10 Fox into RAM like Arai does. Right?

11 A. That sounds right.

12 Q. And so I just want to confirm:
13 This is the same sentence here you have
14 written, and so you are saying also here
15 essentially the same thing as you said
16 before with the same words, that you are
17 putting Fox's register or table into main
18 memory or RAM like Arai teaches?

19 MS. ZHANG: Objection to form.

20 A. What I am saying here in 198 is
21 that a POSITA would understand Fox's
22 register or table storing this information
23 regarding boot and spare processors in its
24 system memory like Arai, and that this
25 POSITA also understands that Fox's system

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2 memory was a non-volatile memory because
3 that's where the BIOS would be stored.
4 Every time you power the machine up you read
5 BIOS out of this --

6 (Reporter interruption.)

7 A. Every time you power the machine
8 up or reboot it -- or power cycle it, I
9 should say -- the BIOS runs again out of
10 this non-volatile memory that's a ROM or an
11 EEPROM, as an example.

12 Q. So the BIOS is embedded in
13 non-volatile memory, which is read-only,
14 right?

15 A. The BIOS is in a non-volatile
16 memory that, in this case, is read-only from
17 Fox because it's something like a ROM as one
18 example, where it's burned into the chip.

19 Q. Okay. And in Arai, which we just
20 looked at, we see that the BIOS creates a
21 table in main memory during start-up. And
22 that table is in RAM, but it's created by
23 the BIOS.

24 So is that what you are saying
25 would be -- when you say "like in Arai," is

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2 that what you are saying would be happening
3 here with the combination of Arai and Fox
4 for claim 2?

5 A. That what's happening in the
6 combination is, just as Arai says in
7 paragraph 21 that you pointed to earlier,
8 that the BIOS goes and creates a table in
9 that main memory during the start-up in the
10 RAM. So, the BIOS is coming out of this
11 read-only memory, running and creating the
12 table in the RAM here.

13 MR. LINDNER: I think I am on the
14 home stretch here. Can I just take five
15 minutes to review my outline and see
16 what I have left?

17 (Recess.)

18 MR. LINDNER: Dr. Brogioli, I
19 don't have any more questions for you as
20 to the '781 IPR. My colleague,
21 Dr. Auchter, will pick it up now with
22 the '302 IPR.

23 THE WITNESS: Okay.

24 EXAMINATION BY

25 MR. AUCHTER:

1 M. BROGIOLI

2 Q. Good afternoon, Dr. Brogioli.

3 How are you doing?

4 A. Good.

5 Q. Thank you.

6 Would you agree that at least
7 with respect to the references discussed
8 today, specifically -- let me make sure I
9 get the names right -- Fox and Arai and
10 Landry and Safford, you applied the same
11 references to the '302 Patent as you did to
12 the '781 Patent?

13 A. That sounds right. As I recall,
14 those references were common between the two
15 patents in my declaration.

16 Q. And did you interpret the
17 references any differently in the context of
18 the '302 Patent than you did in the context
19 of the '781 Patent?

20 A. I don't recall doing that, from
21 memory.

22 Q. Do you have your declaration in
23 front of you? Would you like to look at it
24 to confirm?

25 A. As I was going to say, my

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2 recollection is that those common references
3 were used in the same manner. And I think
4 there is perhaps one additional reference
5 for the '302, the Jin reference, I believe,
6 J-I-N.

7 Q. That's correct. Grounds 1 and 2
8 and Grounds 3 and 4 of the '302 are similar
9 to Grounds 5 and 6 of the '781 because the
10 Jin reference was used for the two
11 intermediate user interface claims, I
12 believe.

13 A. Okay.

14 Q. And is the term "hot spare" used
15 in the '302 Patent?

16 A. One moment.

17 Q. Sorry?

18 A. I was just saying one moment.

19 Q. Oh, of course.

20 A. I have to, unfortunately, go back
21 and look for that.

22 Q. Do you have your declaration for
23 the '302 Patent IPR in front of you?

24 A. I do.

25 Q. Okay, good.

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2 A. So I am looking at my paper copy
3 of the '302 and seeing the phrase "hot
4 spare" used in at least some of the claims,
5 claim language.

6 Q. Is "hot spare" also used in the
7 '781 Patent?

8 A. As I recall, we just talked about
9 that earlier today. Yes.

10 Q. Is there any difference between
11 the usage of "hot spare" in the '302 Patent
12 and the '781 Patent?

13 A. I don't recall identifying that
14 in my declaration.

15 Q. Would a person of ordinary skill
16 in the art have understood the term "hot
17 spare" to have the same meaning in the '302
18 Patent and the '781 Patent, which were
19 concurrently filed by almost identical
20 inventors as well?

21 A. I would say at least to the
22 points that I discussed in my declaration, I
23 think they would view it the same. If there
24 is maybe some corner case between the two
25 that I didn't or wasn't asked to look at or

1 M. BROGIOLI

2 identify, that may be out there. But I
3 don't recall talking about that.

4 Q. And does the '302 Patent use the
5 term "active spare"?

6 A. Yes.

7 Q. And does the '781 Patent use the
8 term "active spare"?

9 (Pause.)

10 A. I am losing track of my documents
11 here.

12 Q. Fortunately, counsel was kind
13 enough to use the same exhibit numbers for
14 the prior art references in both IPR's so it
15 makes life a little easier.

16 A. I am seeing in my paper copy of
17 '781 the use of "active spare," which I
18 think was your question.

19 Q. Yes. Does it use the term
20 "active spare"?

21 A. Yes, it does.

22 Q. Does the term "active spare" have
23 the same meaning in both the '302 and the
24 '781 patents?

25 A. I will give a similar answer as

1 M. BROGIOLI
2 before. To the extent I have talked about
3 it in my declaration, I don't recall drawing
4 differences there. I don't think I was
5 asked to go through and see if there might
6 be some other deviation in the language of
7 the specifications. My points, I think, are
8 addressing them both equally across the two.

9 Q. And would a person of ordinary
10 skill in the art have had the same
11 understanding of the meaning of the term
12 "active spare" in the context of both the
13 '302 and '781 patents?

14 A. I think that would be the case,
15 yes.

16 Q. In your declaration you addressed
17 means-plus-function claim limitations. Do
18 you recall that? And that is in the context
19 of the '302 Patent just to be clear.

20 A. I am just trying to find in my
21 declaration where I talk about that.

22 Q. I believe it's on page 24.

23 A. I apologize.

24 Q. Pages 25 to 26.

25 A. I have been looking in the wrong

1 M. BROGIOLI

2 PDF until now, which is why I am stumbling.

3 Okay. Yes. I have a section
4 starting on page 24 of the '302 declaration
5 talking about the means-plus-function terms.

6 Q. What is the processor abstraction
7 layer?

8 A. It is often referred to as the
9 PAL. It is part of ACPI where it's
10 effectively a layer of the firmware that
11 abstracts away certain information and
12 aspects of the actual physical processor so
13 that other parts of the system can read it.
14 There is also a system abstraction layer
15 that performs something similar.

16 Q. Do you know how large the
17 processor and abstraction layer is in, say,
18 the Itanium processors?

19 A. Well, as I recall, the documents
20 describing it are pretty lengthy and
21 verbose. If you are asking me in terms of
22 bytes of digital storage, I don't recall.
23 I'm sure it would vary depending on the
24 system and how many tables you have for how
25 many processors and things like that. But

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2 I'd have to go look at that.

3 Q. And what about a system
4 abstraction layer? Do you have any idea as
5 to how large that would be in an Itanium
6 processor for example?

7 A. I will give the same answer.
8 There is quite a lot of functionality in
9 there, but I would have to go look at how
10 large or small sort of a runtime deployment
11 of that might be for a given system.

12 Q. Going back to the processor
13 abstraction layer, does that vary for each
14 processor?

15 A. So, there is the processor
16 abstraction layer definition. In terms of
17 does it vary for a processor or processors
18 or system with multiple processors, it would
19 vary depending on the information, tables
20 and state associated with a given machine
21 installation I guess would be the way to say
22 it.

23 Q. Would an Intel processor have the
24 same process abstraction layer as an AMD
25 processor?

1 M. BROGIOLI

2 A. I would expect there to be
3 various differences between the two, perhaps
4 in terms of CPUID or manufacturer ID or what
5 ends up being the digital representation of
6 the underlying processor.

7 Q. And would the system abstraction
8 layer vary depending on the system?

9 A. I'd say the definition of the
10 system abstraction layer is just that, the
11 definition of how it works. In terms of
12 would it look the same on a 2-CPU system of
13 one flavor versus a 16-CPU deployment from a
14 different manufacturer? They would
15 presumably look different in terms of the
16 data and information they held.

17 Q. What is the Extended Firmware
18 Interface or EFI?

19 A. It's another firmware technology
20 and an interface that, as I recall, you can
21 use, interact with to get certain
22 information. And it's another solution
23 that's an extension over what were legacy
24 firmware solutions from years and decades
25 earlier.

1 M. BROGIOLI

2 Q. Is it standardized, "it" being
3 the EFI?

4 A. There is well defined documents
5 describing it. In terms of is there like a
6 governing standards body that owns it or a
7 conglomerate of companies? I forget that
8 information.

9 Q. How many functions are in the
10 processor abstraction layer?

11 A. I'd have to go back and look for
12 you. We'd probably have to define what is a
13 function versus what is information that is
14 stored in there that can be accessed, but
15 there is lots of information.

16 Q. Would it be likely that there are
17 hundreds of functions in a PAL?

18 A. That wouldn't seem unreasonable.

19 Q. And what about for a system
20 abstraction layer?

21 A. I would give a similar answer.

22 Q. Now, for claim limitation 26A,
23 the system firmware means for detecting loss
24 of lockstep, LOL, for a processor and
25 multiprocessor system, would the entire PAL

1 M. BROGIOLI

2 be necessary to perform that function?

3 A. I would say -- I guess I would
4 have to answer that in two ways. The PAL
5 would be needed -- you would need sort of a
6 whole PAL to be a compliant PAL versus just
7 slicing off a third of it or something.

8 At the same time, implementing
9 26A, I don't think someone would need to
10 touch every piece and part of the PAL.
11 There would be a fairly narrow subset that
12 would be used for that.

13 Q. What about the SAL? Would you
14 need the entire SAL to implement the
15 function of detecting loss of lockstep for a
16 processor in a multiprocessor system as
17 recited in 26A?

18 A. I would give a similar answer.
19 You would need a compliant SAL that's sort
20 of an atomic whole. But I would think a
21 POSITA would realize a relatively small part
22 of the overall functionality would be
23 required.

24 Q. And what about the EFI? Would
25 you need the entire Extended Firmware

1 M. BROGIOLI

2 Interface in order to implement detecting
3 loss of lockstep for a processor in a
4 multiprocessor system?

5 A. A similar answer. The whole
6 thing, in the context that it would be a
7 complete and whole EFI, but a subset of the
8 functionality would be required to.

9 Q. And would that also be true for
10 26B, determining whether the processor for
11 which said LOL is detected is assigned the
12 role of boot processor?

13 A. Yes, that is correct.

14 Q. And would that be true for both
15 the PAL, the SAL and the EFI, just to be
16 clear?

17 A. Yes. It would be the same
18 answer.

19 Q. And then the same question with
20 respect to 26C, the "means for switching the
21 role of boot processor to a spare processor
22 without shutting down the system's operating
23 system if determined that the processor for
24 which said LOL is detected is assigned the
25 role of boot processor."

1 M. BROGIOLI

2 A. So, same answer with regard to
3 the PAL, SAL and EFI.

4 Q. Do you remember early this
5 morning, quite a while ago it feels like,
6 the questions that you answered regarding
7 the prior art references, specifically the
8 ones referenced in the grounds vis-a-vis the
9 other documents that are referenced in your
10 report?

11 A. Generally, yes.

12 Q. Well, specifically the question
13 was -- for example, when you were talking
14 about relying on -- sorry, I get them
15 confused -- Fox in view of Safford and Arai,
16 which would be Ground 1, for example, was
17 that based entirely on those references, or
18 did you also look at the other documents and
19 consider those in forming your opinions?

20 A. The combinations relied on
21 those -- for example, Ground 1, the
22 references you just mentioned. Some of the
23 other documents around firmware or things
24 like that, I looked at and were things a
25 POSITA would understand in that context.

1 M. BROGIOLI

2 Q. And then in terms of those other
3 documents, did you do anything differently
4 with respect to your declaration for the
5 '302 Patent than what you did for your
6 declaration on the '781 Patent?

7 A. Not that I recall, no.

8 MR. AUCHTER: Let me take a few
9 minutes if we could take a short break.
10 Hopefully, we can move on and enjoy the
11 weekend.

12 Off the record, please.

13 (Recess.)

14 MR. AUCHTER: At this time we
15 pass the witness to counsel for
16 Petitioner, subject to additional
17 recross.

18 MS. ZHANG: Petitioner has no
19 redirect.

20 MR. AUCHTER: I have no further
21 redirect, but I will let Mr. Lindner
22 speak for himself on that.

23 MR. LINDNER: Nothing from me.

24 (Transcript orders requested.)

25 MS. ZHANG: Regular turn-around

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M. BROGIOLI

is fine.

MR. AUCHTER: I believe our
paralegal has put in our order.

COURT REPORTER: That's fine.
Thank you all.

[TIME NOTED: 2:37 p.m. EDT]

MICHAEL C. BROGIOLI

Subscribed and sworn to
Before me this _____
Day of _____, 2025.

Notary Public

CERTIFICATION

I, DEBRA STEVENS, a Notary Public for
and within the State of New York, do hereby
certify:

That the witness whose testimony as
herein set forth, was duly sworn by me; and
that the within transcript is a true record
of the testimony given by said witness.

I further certify that I am not related
to any of the parties to this action by
blood or marriage, and that I am in no way
interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set
my hand this 12th day of June, 2025.

DEBRA STEVENS, RPR-CRR

* * *

ERRATA SHEET

CASE NAME: BMW of North America LLC et al.,
 v. Foras Technologies Limited
 DATE OF DEPOSITION: June 6, 2025
 WITNESS NAME: Michael C. Brogioli, Ph.D.

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 MICHAEL C. BROGIOLI

SUBSCRIBED AND SWORN TO
 BEFORE ME THIS _____ DAY
 OF _____, 2025.

 NOTARY PUBLIC
 MY COMMISSION EXPIRES _____

TransPerfect Legal Solutions
 212-400-8845 - Depo@TransPerfect.com