

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ACTIVISION BLIZZARD, INC.
ELECTRONIC ARTS, INC.
TAKE-TWO INTERACTIVE SOFTWARE, INC.
2K SPORTS, INC.
ROCKSTAR GAMES, INC. and
BUNGIE, INC.
Petitioners

v.

ACCELERATION BAY, LLC
Patent Owner

Case IPR2016-00747

U.S. Patent No. 6,732,147

VIDEOTAPED DEPOSITION OF DAVID R. KARGER, Ph.D.

Tuesday, November 29, 2016, 9:16 a.m.

Ropes & Gray LLP

800 Boylston Street

Boston, Massachusetts 02199

Reported By:

Janet M. Sambataro, RMR, CRR, CLR

Job No. 189271

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November 29, 2016

<p>Page 2</p> <p>1 APPEARANCES:</p> <p>2</p> <p>3 WINSTON & STRAWN LLP</p> <p>4 (By Michael M. Murray, Esquire)</p> <p>5 200 Park Avenue</p> <p>6 New York, New York 10166</p> <p>7 212.294.6700</p> <p>8 mmurray@winston.com</p> <p>9 Counsel for the Petitioner</p> <p>10</p> <p>11 KRAMER LEVIN NAFTALIS & FRANKEL LLP</p> <p>12 (By Jeffrey H. Price, Esquire)</p> <p>13 1177 Avenue of the Americas</p> <p>14 New York, New York 10036</p> <p>15 212.715.9100</p> <p>16 jprice@kramerlevin.com</p> <p>17 Counsel for the Patent Owner</p> <p>18</p> <p>19 KRAMER LEVIN NAFTALIS & FRANKEL LLP</p> <p>20 (By Michael Lee, Esquire)</p> <p>21 990 Marsh Road</p> <p>22 Menlo Park, California 94025</p> <p>23 650.752.1700</p> <p>24 mlee@kramerlevin.com</p> <p>25 ALSO PRESENT: Mati Kiin, Videographer</p>	<p>Page 4</p> <p>1 P R O C E E D I N G S</p> <p>2 THE VIDEOGRAPHER: This is the</p> <p>3 videotaped deposition of Dr. David Karger taken</p> <p>4 by the defendant in the matter of Activision</p> <p>5 Blizzard, et al., versus Acceleration Bay, LLC,</p> <p>6 in the United States and Trademark Office [sic]</p> <p>7 before the Patent Trial and Appeal Board. This</p> <p>8 is Case No. IPR2016-00747, U.S. Patent</p> <p>9 No. 6,732,147.</p> <p>10 This deposition is being held at</p> <p>11 Ropes & Gray, LLP, on today, November 29, 2016.</p> <p>12 My name is Mati Kiin. I'm representing U.S.</p> <p>13 Legal Support, and I am the video specialist.</p> <p>14 Our court reporter today is Janet Sambataro, also</p> <p>15 from U.S. Legal Support. We're going on the</p> <p>16 record at 9:16 a.m.</p> <p>17 I will now ask counsel to please state</p> <p>18 their appearances for the record.</p> <p>19 MR. PRICE: Good morning. My name is</p> <p>20 Jeffrey Price. I am here representing the patent</p> <p>21 owner, Acceleration Bay, LLC.</p> <p>22 MR. MURRAY: This is Michael Murray</p> <p>23 with Winston & Strawn, representing petitioner.</p> <p>24 MR. LEE: Michael Lee from Kramer</p> <p>25 Levin, representing the patent owner.</p>
<p>Page 3</p> <p>1 I N D E X</p> <p>2 WITNESS DIRECT CROSS REDIRECT</p> <p>3 DAVID R. KARGER, Ph.D.</p> <p>4 By Mr. Price 5</p> <p>5</p> <p>6 E X H I B I T S</p> <p>7 Number Description Page</p> <p>8 Exhibit 1 Declaration of David R. Karger</p> <p>9 in Support of the Petition for</p> <p>10 an Inter Partes Review of</p> <p>11 United States Patent Nos.</p> <p>12 6,732,147 and 6,910,069 6</p> <p>13 Exhibit 2 United States Patent No.</p> <p>14 6,732,147 14</p> <p>15 Exhibit 3 Article entitled "Hybrid</p> <p>16 Routing in Dynamic Networks" 41</p> <p>17 Exhibit 4 Article entitled "'Evolution'</p> <p>18 by vertex of even-order</p> <p>19 regular graphs" 53</p> <p>20 Exhibit 5 Article entitled "A Study on</p> <p>21 the Inaccessibility</p> <p>22 Characteristics of ISO 8802/4</p> <p>23 Token-Bus LANs" 58</p> <p>24 Exhibit 6 Article entitled "The Token</p> <p>25 Grid Network" 71</p>	<p>Page 5</p> <p>1 THE VIDEOGRAPHER: Thank you. I'll now</p> <p>2 ask the court reporter to swear in the witness,</p> <p>3 and we can proceed.</p> <p>4 DAVID R. KARGER, Ph.D.,</p> <p>5 having been duly affirmed, after presenting</p> <p>6 identification in the form of a driver's license,</p> <p>7 deposes and says as follows:</p> <p>8 DIRECT EXAMINATION</p> <p>9 BY MR. PRICE:</p> <p>10 Q. Good morning, Dr. Karger.</p> <p>11 A. Good morning.</p> <p>12 Q. Can you please state your full name and</p> <p>13 address for the record.</p> <p>14 A. My name is David Karger. I'm at 21</p> <p>15 Craigie Street, Cambridge, Massachusetts 02138.</p> <p>16 Q. Do you understand why you're here</p> <p>17 today?</p> <p>18 A. Yes, I am.</p> <p>19 Q. And why is that?</p> <p>20 A. I'm providing expert testimony in</p> <p>21 regard to the case that was just read off by the</p> <p>22 court videographer.</p> <p>23 Q. And have you offered any opinions in</p> <p>24 this case?</p> <p>25 A. I have, through the declaration that I</p>

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<p>Page 6</p> <p>1 have submitted.</p> <p>2 MR. PRICE: Okay. I'm going to hand</p> <p>3 you an exhibit that will be marked Exhibit 1.</p> <p>4 (Declaration of David R. Karger</p> <p>5 in Support of the Petition for an Inter</p> <p>6 Partes Review of United States Patent Nos.</p> <p>7 6,732,147 and 6,910,069 marked Exhibit "I.")</p> <p>8 MR. MURRAY: I don't need it. Thank</p> <p>9 you.</p> <p>10 BY MR. PRICE:</p> <p>11 Q. Do you recognize this document,</p> <p>12 Dr. Karger?</p> <p>13 A. Yes. This is the declaration which I</p> <p>14 submitted.</p> <p>15 Q. Is that your signature on Page 141?</p> <p>16 A. I sure hope so. Yes, it is.</p> <p>17 Q. And did you sign this declaration on</p> <p>18 March 11, 2016?</p> <p>19 A. I would have to -- I would just have to</p> <p>20 check my records to verify the date, but I</p> <p>21 believe that's correct.</p> <p>22 Q. It says right above your signature --</p> <p>23 A. Oh, yeah, sorry. Yes. That is</p> <p>24 correct.</p> <p>25 Q. Was it your understanding that as of</p>	<p>Page 8</p> <p>1 A. I work at the Massachusetts Institute</p> <p>2 of Technology in the computer science and</p> <p>3 artificial intelligence laboratory in the</p> <p>4 electrical engineering and computer science</p> <p>5 department.</p> <p>6 Q. And do you teach any courses at MIT?</p> <p>7 A. I do.</p> <p>8 Q. What courses do you teach?</p> <p>9 A. I've taught quite a few. I teach the</p> <p>10 graduate courses on algorithms and randomized</p> <p>11 algorithms.</p> <p>12 I have taught undergraduate introductory</p> <p>13 programming, undergraduate software engineering,</p> <p>14 undergraduate computer systems, a course on open</p> <p>15 source software engineering, probably -- I'm</p> <p>16 probably omitting one or two, but that's what I</p> <p>17 can recall at present.</p> <p>18 Q. So you're familiar with computer</p> <p>19 networks?</p> <p>20 A. Yes, I am.</p> <p>21 Q. And can you tell me what a computer</p> <p>22 network is?</p> <p>23 A. A computer network is a network of</p> <p>24 computers.</p> <p>25 Q. Can you elaborate on what you mean by</p>
<p>Page 7</p> <p>1 March 11th, you were supposed to put into your</p> <p>2 report all of your opinions that you have in this</p> <p>3 case?</p> <p>4 A. That I was supposed to put in all of my</p> <p>5 opinions. I put into this -- I put into this</p> <p>6 document all of the opinions that I considered</p> <p>7 necessary in order to make the points that I</p> <p>8 was -- that I was making.</p> <p>9 Q. Does this document contain all of your</p> <p>10 opinions for Case No. IPR2016-00747?</p> <p>11 A. It contains the opinions that I've</p> <p>12 formed so far. I've reserved the right to revise</p> <p>13 those opinions based on additional information as</p> <p>14 I receive it.</p> <p>15 Q. Are there any corrections to the</p> <p>16 declaration you'd like to make at this time?</p> <p>17 A. Not that I found so far.</p> <p>18 Q. Okay. Are you aware of anything</p> <p>19 concerning your bases for the opinions in this</p> <p>20 case that were not included in Exhibit 1?</p> <p>21 A. Not that I can recall at present.</p> <p>22 Q. And can you think of anything today</p> <p>23 that you would need to cite additionally?</p> <p>24 A. No.</p> <p>25 Q. Okay. Where do you work, Dr. Karger?</p>	<p>Page 9</p> <p>1 "a network of computers"?</p> <p>2 A. Well, I think we can agree on what a</p> <p>3 computer is. And a network is a -- an</p> <p>4 interconnection of some of those computers in</p> <p>5 some form.</p> <p>6 Q. Are you familiar with the OSI model of</p> <p>7 computer networks?</p> <p>8 A. Yes, I am.</p> <p>9 Q. Can you please explain to me your</p> <p>10 understanding of the OSI model.</p> <p>11 A. So the OSI model is an abstract model</p> <p>12 of computer networking -- an abstraction of</p> <p>13 computer networking protocols that separates out</p> <p>14 different aspects of computer communication and</p> <p>15 functionality into layers that can often be</p> <p>16 considered separately.</p> <p>17 Q. Would a person of skill in the art have</p> <p>18 known about the OSI model in the year 2000?</p> <p>19 A. Yes, they would.</p> <p>20 Q. Are you familiar with the Tanenbaum</p> <p>21 textbook called Computer Networks?</p> <p>22 A. Yes, I am.</p> <p>23 Q. Who would you consider to be the target</p> <p>24 audience for the Tanenbaum textbook?</p> <p>25 A. The target audience? I'd probably</p>

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<p>Page 10</p> <p>1 identify a person of ordinary skill in the art in</p> <p>2 computing with an interest in networking.</p> <p>3 Q. So you would consider the Tanenbaum</p> <p>4 textbook a reference that a person of ordinary</p> <p>5 skill in the art would have known and used about?</p> <p>6 A. Yes, I would.</p> <p>7 Q. In the year 2000?</p> <p>8 A. Yes.</p> <p>9 Q. Can you turn to Paragraph 83 of your</p> <p>10 declaration, please.</p> <p>11 (Witness complies.)</p> <p>12 A. Yes.</p> <p>13 Q. Do you see where you state, "I have</p> <p>14 been informed that for the purposes of this inter</p> <p>15 partes review, the standard for claim</p> <p>16 construction of terms within the claims of the</p> <p>17 patent is the broadest reasonable construction in</p> <p>18 light of the specification"?</p> <p>19 A. Page 83. Do you mean Paragraph 83?</p> <p>20 Q. Paragraph 83.</p> <p>21 A. Yes.</p> <p>22 Q. What do you mean by "in light of the</p> <p>23 specification"?</p> <p>24 A. Well, if the specification explicitly</p> <p>25 rules something out, then I should not include</p>	<p>Page 12</p> <p>1 term can be construed in a manner inconsistent</p> <p>2 with the specification?</p> <p>3 A. No. I don't think that a claim term</p> <p>4 can be construed in a manner inconsistent with</p> <p>5 the specification.</p> <p>6 Q. Is it your understanding that a claim</p> <p>7 term can be construed in a manner that does not</p> <p>8 reasonably reflect the plain language and</p> <p>9 disclosure of the specification?</p> <p>10 A. Does not reasonably reflect the plain</p> <p>11 language. I guess that depends on what you mean</p> <p>12 by "reasonably" and "reflect" and "disclosure."</p> <p>13 As I already said, the -- I've been informed</p> <p>14 that I'm supposed to give the broadest reasonable</p> <p>15 construction in light of the specification. And</p> <p>16 so, for example, if the plain language of the</p> <p>17 specification doesn't say anything in particular</p> <p>18 about the term, then I'm -- is that broadest</p> <p>19 reasonable construction reflecting what's in the</p> <p>20 specification? I suppose that it is.</p> <p>21 Q. And if the specification does contain a</p> <p>22 description that would give a person of ordinary</p> <p>23 skill in the art an understanding of what that</p> <p>24 term means, is that description relevant to how</p> <p>25 you construe the claim term?</p>
<p>Page 11</p> <p>1 that into the broadest reasonable construction.</p> <p>2 Q. What do you mean by "explicitly rules</p> <p>3 something out"?</p> <p>4 A. Well, if, for example, the</p> <p>5 specification says that computer network does not</p> <p>6 mean network of computers, but means a -- a red</p> <p>7 car, then I would presumably need to give that</p> <p>8 weight in my reading of the specification.</p> <p>9 Q. Is it your opinion that the phrase "in</p> <p>10 light of the specification" only applies when the</p> <p>11 specification explicitly rules something out?</p> <p>12 A. Well, it certainly does apply when the</p> <p>13 specification explicitly rules something out. I</p> <p>14 could imagine there might be some ways to kind of</p> <p>15 give explicit statements that hedge around things</p> <p>16 in a way to rule them out by implication.</p> <p>17 I don't think I relied on any such reading</p> <p>18 in the interpretations that I was making in this</p> <p>19 case.</p> <p>20 Q. Is it your understanding that a claim</p> <p>21 term can be construed in a manner inconsistent</p> <p>22 with the specification?</p> <p>23 A. I'm sorry. Could you restate the</p> <p>24 question.</p> <p>25 Q. Is it your understanding that a claim</p>	<p>Page 13</p> <p>1 A. Well, for example, the specification</p> <p>2 might use the term in some embodiment in a way</p> <p>3 that leads you to understand its meaning in that</p> <p>4 embodiment, but its use in that embodiment does</p> <p>5 not necessarily indicate how it should be used</p> <p>6 throughout the -- throughout the -- throughout</p> <p>7 the patent.</p> <p>8 Q. What is your understanding of the term</p> <p>9 "embodiment"?</p> <p>10 (Discussion off the record.)</p> <p>11 Q. What is your understanding of the term</p> <p>12 "embodiment" that you just used?</p> <p>13 A. My understanding of the term</p> <p>14 "embodiment" is that it is sort of an example of</p> <p>15 something which is supposed to be practicing the</p> <p>16 claims of the patent or some of the claims of the</p> <p>17 patent.</p> <p>18 Q. Can you please refer to Paragraph 89 of</p> <p>19 your declaration.</p> <p>20 A. Yes.</p> <p>21 Q. Can you please explain what you mean by</p> <p>22 "plain and ordinary meaning"?</p> <p>23 A. Well, "plain and ordinary meaning" has</p> <p>24 a plain and ordinary meaning. It's what these</p> <p>25 terms mean in general use, as a person of</p>

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<p>Page 14</p> <p>1 ordinary skill would understand them.</p> <p>2 Q. Can you please explain how you</p> <p>3 determine the plain and ordinary meaning for the</p> <p>4 claim terms in Claim 6 of the '147 patent?</p> <p>5 A. For the terms in Claim 6 --</p> <p>6 Q. Yes.</p> <p>7 A. -- you said? Could I have a copy of</p> <p>8 the patent?</p> <p>9 MR. PRICE: The court reporter will</p> <p>10 hand you a document labeled Exhibit 2.</p> <p>11 (United States Patent No.</p> <p>12 6,732,147 marked Exhibit 2.)</p> <p>13 BY MR. PRICE:</p> <p>14 Q. Do you recognize Exhibit 2?</p> <p>15 A. Yes, I do.</p> <p>16 Q. This is U.S. Patent 6,732,147, which</p> <p>17 was submitted as Exhibit 1001 in IPR2016-00747.</p> <p>18 Is that correct?</p> <p>19 A. Yes.</p> <p>20 Q. Okay. And so can you please explain</p> <p>21 how you determine the plain and ordinary meaning</p> <p>22 of the terms that exist in Claim 6 of the '147</p> <p>23 patent.</p> <p>24 A. Could you restate the question.</p> <p>25 Q. Can you please explain how you</p>	<p>Page 16</p> <p>1 Q. Did your process of determining the</p> <p>2 plain and ordinary meaning for the rest of the</p> <p>3 claim terms in Claim 6 involve reading the</p> <p>4 specification of the '147 patent?</p> <p>5 A. Certainly.</p> <p>6 Q. Is it your understanding that the '147</p> <p>7 patent used the term "broadcast channel"?</p> <p>8 A. Yes, it is.</p> <p>9 Q. Is it your understanding that the term</p> <p>10 "broadcast channel" is used in Claim 6 of the</p> <p>11 '147 patent?</p> <p>12 A. Yes, it is.</p> <p>13 Q. Okay. In forming your opinion on the</p> <p>14 validity of the '147 patent, did you come to an</p> <p>15 understanding of what the term "broadcast</p> <p>16 channel" means?</p> <p>17 A. Well, again, a broadcast channel</p> <p>18 certainly has plain and ordinary meaning to</p> <p>19 people of skill in the art, and that was the</p> <p>20 understanding that I applied.</p> <p>21 Q. And what is the plain and ordinary</p> <p>22 meaning of "broadcast channel"?</p> <p>23 A. A broadcast channel is a channel for</p> <p>24 broadcasting information.</p> <p>25 Q. Can you elaborate on that, please?</p>
<p>Page 15</p> <p>1 determine the plain and ordinary meaning of the</p> <p>2 terms in Claim 6 of the '147 patent?</p> <p>3 A. Sure. So I determined the plain and</p> <p>4 ordinary meanings by reflecting on my own</p> <p>5 knowledge, my educational background and my</p> <p>6 experience in the field, my understanding of</p> <p>7 teaching curricula, which would have informed</p> <p>8 people who became people of ordinary skill in the</p> <p>9 art, and my experience in how people of ordinary</p> <p>10 skill tend to converse when they are talking</p> <p>11 about the materials in -- by talking about this</p> <p>12 topic.</p> <p>13 Q. Is it correct to say that you apply the</p> <p>14 plain and ordinary meaning for each claim term in</p> <p>15 Claim 6 of the '147 patent, except for the term</p> <p>16 "m-regular"?</p> <p>17 A. Well, as you can see in Paragraphs 84</p> <p>18 through 88 of my declaration, I was asked to</p> <p>19 assume or I was asked to assume constructions for</p> <p>20 four terms, and for all of the terms not listed</p> <p>21 among those four, I was asked to assume their</p> <p>22 plain and ordinary meaning.</p> <p>23 I believe that "m-regular" is the only one</p> <p>24 of the four terms appearing in this particular</p> <p>25 claim. So, yes, that would be correct.</p>	<p>Page 17</p> <p>1 MR. MURRAY: Object to the form.</p> <p>2 A. Well, a broadcast is a transmission of</p> <p>3 information to all recipients, and a channel is</p> <p>4 some type of medium that can carry that</p> <p>5 broadcast.</p> <p>6 Q. What do you mean by the term "medium"?</p> <p>7 A. Well, in this world, things don't</p> <p>8 instantaneously teleport from one place to</p> <p>9 another place. They have to get from one place</p> <p>10 to another place somehow. They travel through</p> <p>11 something, and that is often referred to as a</p> <p>12 "medium."</p> <p>13 A medium could be the air. It could be the</p> <p>14 electromagnetic -- we don't have an ether, but</p> <p>15 the electromagnetic environment. It could be a</p> <p>16 wire. It could be a collection of people who are</p> <p>17 passing information to one another.</p> <p>18 It is whatever is carrying the information.</p> <p>19 Q. And is that the understanding a person</p> <p>20 of ordinary skill in the art reading the '147</p> <p>21 patent would have had in July of 2000?</p> <p>22 A. Yes. I believe so.</p> <p>23 Q. Is the term "broadcast channel" a term</p> <p>24 of art in the field of computer networks?</p> <p>25 A. A term of art? I mean, it is a term</p>

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<p>Page 18</p> <p>1 that I think anyone in our -- any person of 2 ordinary skill would understand it and would 3 understand it to have a meaning similar to the 4 one that I just outlined. 5 Q. Is it your opinion that a broadcast 6 channel must support broadcast messages? 7 A. Must support broadcast messages. Must? 8 If you use the phrase "broadcast channel," you 9 are implying that the channel can be used for 10 broadcasting. 11 Q. In coming to your understanding of the 12 plain and ordinary meaning of the term "broadcast 13 channel," did you consider the specification of 14 the '147 patent? 15 A. I did. 16 Q. Can you tell me what portions of the 17 '147 patent you relied on? 18 A. I considered the entire specification. 19 Q. Are there any specific portions of the 20 '147 that you can point to? 21 A. I mean, the specification begins -- or, 22 sorry, the patent begins by saying -- sorry, 23 that's not the specification, by saying -- in 24 the -- the technical field section of this patent 25 says that "the described technology relates</p>	<p>Page 20</p> <p>1 Lines 5 through 7, of the '147 patent. 2 A. Yes. 3 Q. Can you read the sentence that starts 4 on Line 5, please? 5 A. "A broadcast technique in which a 6 broadcast channel overlays a point-to-point 7 communications network is provided." 8 Q. So what does this sentence mean to you? 9 A. Well, it elaborates on the sentence we 10 were previously discussing by saying that the 11 underlying network is a point-to-point 12 communications network; that is, it is made up of 13 connections that allow a single computer to talk 14 to another computer, one other computer, and that 15 this broadcast channel is then overlaid on this 16 communications network. 17 Q. So would a person of ordinary skill in 18 the art, reading this sentence, understand that 19 the broadcast channel of the '147 patent is an 20 overlay? 21 A. Yes. I think they would understand 22 that the broadcast channel overlays the 23 communications network. 24 I should be clearer, since this has come up 25 in other depositions, that this does not</p>
<p>Page 19</p> <p>1 generally to a computer network and more 2 particularly to a broadcast channel for a subset 3 of computers of an underlying network." 4 Q. What is your understanding of the term 5 "underlying network," as used in the sentence 6 that you just read to me? 7 A. My understanding is that there is a 8 network that these computers are part of. 9 Q. What does the term "underlying" mean? 10 A. What does the term "underlying" mean? 11 Well, generally -- I mean, this is speaking in 12 general terms, but generally I would understand 13 this to mean that we are talking about a set of 14 computers that are -- that are already part of a 15 network and that this patent is going to describe 16 some mechanism for providing a broadcast channel 17 for those computers that are already part of a 18 network. 19 Q. Does the term "underlying" mean that 20 there's an overlay on top of the underlying 21 network? 22 A. So this statement hints that the 23 broadcast channel itself is somehow going to be 24 overlaid on the underlying network. 25 Q. Can you please refer to Column 4,</p>	<p>Page 21</p> <p>1 necessarily mean that the broadcast channel is 2 being thought of as an overlay network. 3 However, the broadcast channel itself can be 4 understood to overlay the communications network. 5 Q. Could you please refer to Lines 25 6 through 28 in Column 4 -- 7 A. Yes. 8 Q. -- of the '147 patent. Can you read 9 that sentence, please? 10 A. "The broadcast technique overlays the 11 underlying network system with a graph of 12 point-to-point connections (i.e., edges) between 13 host computers through which the broadcast 14 channel is implemented." 15 Q. Does this sentence mean that the 16 computers that are connected to the broadcast 17 channel are part of an overlaid network? 18 A. So in my -- as far as I understand it, 19 this sentence simply asserts that there is a 20 graph of point-to-point connections that is 21 defined between the host computers. 22 The remainder of this embodiment, which 23 talks about -- sorry, the remainder of this 24 paragraph does talk about broadcasting a message 25 by sending the message to its neighbors using its</p>

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<p>Page 22</p> <p>1 point-to-point connections. That is discussed in 2 the context of a single embodiment of this 3 invention.</p> <p>4 I'll note as well that the claims under 5 discussion don't refer to any overlay process. 6 They simply talk about methods for healing a 7 disconnection of computers connected to a 8 broadcast channel.</p> <p>9 Q. Does the sentence I asked you to read 10 include the term "embodiment"?</p> <p>11 A. I'm sorry. Did you ask me only about 12 the sentence? I thought you had asked farther 13 ahead. So the first sentence does not refer to 14 an embodiment.</p> <p>15 It simply says that there is this broadcast 16 technique that overlays the underlying network 17 with a graph of point-to-point connections. So 18 it does describe an overlay.</p> <p>19 Q. And the -- does it describe an overlay 20 network?</p> <p>21 A. So this sentence does describe a 22 network overlaid on an underlying network.</p> <p>23 Q. And you referred to Claim 6 in your 24 previous answer. Is that correct?</p> <p>25 A. Yes, I did.</p>	<p>Page 24</p> <p>1 A. Well, because the network itself can be 2 considered a broadcast channel. Right. If I use 3 the network to send information from one computer 4 to all other computers, then that network is 5 serving as a broadcast channel, which is overlaid 6 on the network.</p> <p>7 Q. What if the broadcast channel is an 8 overlay, are the computers connected to that 9 broadcast channel an overlay network?</p> <p>10 A. Well, as I just said, if I use an 11 existing network for broadcasting, then I have 12 overlaid a broadcast channel onto that network, 13 but I have not necessarily defined an overlay 14 network.</p> <p>15 Q. So is it your opinion that computers 16 can be connected to a broadcast channel overlay 17 without being part of an overlay network?</p> <p>18 A. Yes, it is.</p> <p>19 Q. Is it your opinion that computers can 20 be connected to each other through a broadcast 21 that is an overlay without being part of an 22 overlay network?</p> <p>23 A. Connected to each other through a 24 broadcast channel. Well, again, taking 25 "connection" here to have its plain and ordinary</p>
<p>Page 23</p> <p>1 Q. Claim 6 does include the term 2 "broadcast channel." Correct?</p> <p>3 A. Correct.</p> <p>4 Q. You previously stated that a broadcast 5 channel refers to an overlay. Is that correct?</p> <p>6 A. No. Sorry, I said that a broadcast 7 channel is typically overlaid on a network, yes, 8 but I did not say that a broadcast channel is 9 necessarily an overlay network.</p> <p>10 Q. In the context of the '147 patent, do 11 you understand the broadcast channel to be 12 overlaid on an underlying network?</p> <p>13 A. I do understand that the broadcast 14 channel -- as I said, the broadcast channel is 15 overlaid on an underlying network, which does not 16 necessarily mean that there is an overlay 17 network. It just means that there is an 18 overlaid -- that the underlying network is being 19 used as a channel for broadcasting.</p> <p>20 Q. Okay. Are -- if computers are 21 connected to the broadcast channel, are those 22 computers part of an overlay network?</p> <p>23 A. I do not believe that is necessarily 24 the case.</p> <p>25 Q. Why not?</p>	<p>Page 25</p> <p>1 meaning, if one computer is able to broadcast to 2 a number of other computers, then I would say 3 that those computers are connected to each other 4 through the broadcast channel.</p> <p>5 Q. And those computers are part of an 6 overlay network?</p> <p>7 A. I didn't say that.</p> <p>8 Q. But would that be an accurate 9 description?</p> <p>10 A. Again, not necessarily. Right. A 11 broadcast channel is simply a medium -- we talk 12 about a broadcast channel when we're referring to 13 a medium for broadcasting. And if I set up a 14 network and then use that to broadcast 15 information from one computer to other computers 16 on the network, I have overlaid a broadcast 17 channel on that network.</p> <p>18 I don't necessarily see an overlay network. 19 I just see an overlaid broadcast channel.</p> <p>20 Q. Why don't you see an overlay network?</p> <p>21 A. Because I'm using the network itself to 22 do the broadcast. I don't need -- I mean, 23 overlay networking is a useful networking 24 concept, a useful networking technology, but I'm 25 not required to use it.</p>

David R. Karger, Ph.D.
November 29, 2016

<p>Page 26</p> <p>1 Q. Why would you set up a broadcast 2 channel as an overlay if you weren't going to use 3 it to implement an overlay network?</p> <p>4 A. Because I would want to -- because I 5 want to be able to broadcast information from one 6 computer to other computers on a network.</p> <p>7 Q. In that case, what would the "broadcast 8 channel overlay" refer to?</p> <p>9 A. It would refer to this -- whatever I 10 have set up that is able to perform a broadcast 11 from one computer to other computers on the 12 network.</p> <p>13 Q. So, in this case, would you consider IP 14 multicast an overlay?</p> <p>15 A. Would I consider IP multicast an 16 overlay? Well, so IP multicast does provide a 17 broadcast channel for participants in a 18 multicast. IP multicast does so by defining an 19 overlay network.</p> <p>20 Q. Do you understand the '147 patent to be 21 concerned with overlay networks of the type that 22 includes IP multicast?</p> <p>23 A. I certainly think that IP multicast 24 networks are relevant. They sort of are in the 25 same subject domain as the material discussed in</p>	<p>Page 28</p> <p>1 meaning of the term "healing a disconnection" in 2 forming my opinions. And the answer is, yes, I 3 did.</p> <p>4 As we discussed previously, it's not one of 5 the terms that I was asked to construe a 6 particular meaning for, so I gave it the plain 7 and ordinary meaning of "healing a 8 disconnection," and I did consider that plain and 9 ordinary meaning in my assessment of the claims.</p> <p>10 Q. Did you put down your opinion on the 11 plain and ordinary meaning of the term "healing a 12 disconnection" in your declaration?</p> <p>13 A. I don't recall recording it. If you 14 want to point me somewhere, I can take a look.</p> <p>15 Q. In your opinion, what is the plain and 16 ordinary meaning of "healing a disconnection"?</p> <p>17 A. So generally speaking, the plain and 18 ordinary meaning of "healing" is taking action to 19 repair or overcome the damage caused by 20 something.</p> <p>21 Q. Did you consider the specification of 22 the '147 patent in coming to your understanding 23 of the meaning of "healing a disconnection"?</p> <p>24 A. Yes, I did.</p> <p>25 Q. How did the specification of the '147</p>
<p>Page 27</p> <p>1 this patent. I'm not sure if that is what you 2 were asking.</p> <p>3 Q. Would IP multicast be considered an 4 overlay of an underlying network with a graph of 5 point-to-point connections between host 6 computers?</p> <p>7 A. Yes. IP multicast is implemented that 8 way, in general.</p> <p>9 Q. Is IP multicast a point-to-point 10 connection or a point-to-multipoint connection?</p> <p>11 A. IP multicast is, in general, 12 implemented on top of IP and is, therefore, 13 implemented on top of a network that provides 14 point-to-point connections, and it leverages 15 those point-to-point connections to provide 16 point-to-multipoint communication.</p> <p>17 Q. Did you consider the meaning of the 18 claim term "healing a connection" in forming your 19 opinion regarding the validity of the '147 20 patent?</p> <p>21 A. I did.</p> <p>22 Q. Is your opinion on the meaning of this 23 term in your declaration? And I'm sorry, I 24 should have said "healing a disconnection."</p> <p>25 A. So you asked whether I considered the</p>	<p>Page 29</p> <p>1 patent inform your understanding of the meaning 2 of "healing a disconnection"?</p> <p>3 A. Well, again, everything in the '147 4 patent, at least as I recall at present, was 5 consistent with this plain and ordinary meaning 6 of "healing." And so I was able to continue to 7 apply that plain and ordinary meaning in my 8 reading.</p> <p>9 Q. Are there particular portions of the 10 '147 patent that are particularly salient to your 11 understanding of the term "healing a 12 disconnection"?</p> <p>13 A. Well, I mean, for example, Claim 6 does 14 describe a method for healing a disconnection, so 15 that makes it particularly salient.</p> <p>16 Q. And what do you understand -- I'm 17 sorry.</p> <p>18 How does Claim 6 inform your understanding 19 of the meaning of the term "healing a 20 disconnection"?</p> <p>21 A. Well, again, Claim 6 describes a method 22 for dealing with damage caused by a disconnection 23 and a particular way of coping with it and is, 24 therefore, consistent with that plain and 25 ordinary meaning of "healing a disconnection."</p>

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<p style="text-align: right;">Page 30</p> <p>1 Q. Can you turn to Column 8, Lines 66 and 2 67, of the '147 patent, please. 3 (Witness complies.) 4 A. Yes. 5 Q. Can you read that sentence, please. 6 A. "A connected computer disconnects from 7 the broadcast channel either in a planned or 8 unplanned manner." 9 Q. Do you understand the term "healing a 10 disconnection" to apply to a computer 11 disconnecting from the broadcast channel in a 12 planned manner? 13 A. Well, so we're talking about the term 14 "healing," which appears in Claim 6. At present, 15 I can't recall whether that term also appears in 16 the specification itself. 17 THE WITNESS: Sorry, could you read 18 back the question. 19 (The following question was read by 20 the reporter, as requested.) 21 "QUESTION: Do you understand the term 22 'healing a disconnection' to apply to a computer 23 disconnecting from the broadcast channel in a 24 planned manner?" 25 A. So Claim 6 uses the term "healing," but</p>	<p style="text-align: right;">Page 31</p> <p>1 it does not describe a planned or an unplanned 2 disconnection. It's silent on that -- on that 3 distinction. 4 I certainly could imagine using the term 5 "healing" to talk about a planned -- about coping 6 with planned damage, as well as coping with 7 unplanned damage. When somebody goes into the 8 hospital for elective surgery, we still will 9 refer to them as "healing" after that elective 10 surgery. So I don't think that this single use 11 of the term "healing" really pins us down as to a 12 planned or an unplanned disconnection. 13 Q. Does the rest of Claim 6 inform a 14 person of ordinary skill in the art whether or 15 not the method applies to a planned or unplanned 16 disconnection? 17 A. I don't think it really definitively 18 determines whether the connection was planned 19 or -- whether the disconnection was planned or 20 unplanned. 21 Q. Did you consider the prosecution 22 history of the '147 patent in coming to your 23 understanding of the meaning of the term "healing 24 a disconnection"? 25 A. I did consider the prosecution history,</p>	<p style="text-align: right;">Page 32</p> <p>1 yes. 2 Q. How did the prosecution history of the 3 '147 patent inform your understanding of the 4 meaning of "healing a disconnection"? 5 A. So at present, I don't recall anything 6 in that prosecution history that influenced my 7 interpretation of the meaning. There might have 8 been something there, but there's a lot there. I 9 may have -- I may not be recalling everything 10 that I saw when I was considering it. 11 Q. Did you consider the meaning of the 12 term "message" when forming your opinion 13 regarding validity of the '147 patent? 14 A. Yes, I did. 15 Q. And is that opinion in your 16 declaration? 17 A. Once again, as stated in Paragraphs 84 18 through 89, aside from the four terms listed 19 there, I took the plain and ordinary meanings of 20 terms. 21 Q. And what is the plain and ordinary 22 meaning of the term "message" as it's used in the 23 claims of the '147 patent? 24 A. A "message" is some kind of information 25 that is delivered from a sender to a recipient or</p>	<p style="text-align: right;">Page 33</p> <p>1 multiple recipients, or at least that is intended 2 for delivery. It may not arrive. 3 Q. Did you consider the meaning of the 4 term "broadcasting" in forming your opinion of 5 the validity of the '147 patent? 6 A. Yes, I did. 7 Q. Is that opinion in your declaration? 8 A. Once again, "broadcast" is another term 9 which has plain and ordinary meaning. 10 Q. What is the plain and ordinary meaning 11 of "broadcasting"? 12 A. Broadcasting is sending information to 13 all participants in a broadcast. 14 Q. What are "participants"? 15 A. That's another 16 plain-and-ordinary-meaning term. That's whoever 17 is participating in an activity. 18 Q. Who were the participants that receive 19 a broadcast message in Claim 6 of the '147 20 patent? 21 A. Sorry, you asked me who are the 22 participants in Claim 6? So Claim 6 doesn't use 23 the term "participants." 24 Q. Well, you used the term "participants" 25 in order to define the term "broadcasting," and</p>
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<p style="text-align: right;">Page 34</p> <p>1 I'm wondering who the participants are who 2 receive the broadcast?</p> <p>3 A. I see. Okay. So Claim 6 uses the 4 phrase "when the attempt to send the message is 5 unsuccessful, broadcasting from the first 6 computer a connection port search message 7 indicating that the first computer needs a 8 connection."</p> <p>9 And so, in that case, the participants would 10 be anyone listening for that sort of connectfon 11 port search message.</p> <p>12 Q. And would those be participants of the 13 m-regular graph where m is at least three?</p> <p>14 A. Participants of the m-regular graph? 15 Sorry. Could you repeat the question.</p> <p>16 Q. Would those participants -- would those 17 be participants of the m-regular graph where m is 18 at least three?</p> <p>19 A. Got it. So looking at Claim 6, it is 20 not obvious that they must be participants in the 21 channel themselves. It would be quite reasonable 22 to talk about a broadcast channel. And in this 23 case, a broadcast channel being an m-regular 24 graph where m is at least three, and having 25 participants who are connected to a broadcast</p>	<p style="text-align: right;">Page 36</p> <p>1 the broadcast that traverses that broadcast 2 channel.</p> <p>3 Q. Do you think it's reasonable to 4 construe Claim 6 in a way that covers an intercom 5 that broadcasts to people?</p> <p>6 A. Well, no, because I would not 7 probably -- I would probably not refer to -- I 8 would probably not consider intercoms to be 9 computers.</p> <p>10 I was simply responding to your request for 11 an example of participants who were not 12 themselves in the broadcast channel, or who were 13 not themselves forming the broadcast channel.</p> <p>14 Q. Okay. So --</p> <p>15 A. To be clear, the prior art that I 16 considered and the ways in which I considered 17 that prior art to render these claims obvious, in 18 those examples, the participants who are 19 performing the broadcasts are themselves the 20 nodes that make up the m-regular graph. So this 21 is all somewhat hypothetical.</p> <p>22 Q. Did you consider the meaning of the 23 term "connected" in forming your opinion 24 regarding validity of the '147 patent? 25</p> <p>A. Yes, I did.</p>
<p style="text-align: right;">Page 35</p> <p>1 channel; that is, who are making use of the 2 broadcast channel to broadcast to one another, 3 but are themselves -- that they are connected to 4 the broadcast channel, but they do not 5 necessarily form the broadcast channel. Right.</p> <p>6 Now, I should say that in my consideration 7 of prior art and the obviousness of the claims, 8 in the prior art that I considered, the 9 recipients of the broadcast, the participants are 10 themselves the nodes that make up this m-regular 11 graph of degree at least three. But I can 12 certainly imagine some reasonable, reasonable 13 examples in which there would be a broadcast 14 channel made up of an m-regular graph but with 15 participants who were listening on that broadcast 16 channel but were not necessarily part of it.</p> <p>17 Q. And can you give me an example of those 18 reasonable examples?</p> <p>19 A. So if, for example, we had a number of 20 people with an intercom system and one person 21 used that intercom to announce something to a 22 bunch of other people who were listening, I would 23 probably refer to the intercom system itself as 24 the broadcast channel and have -- I would refer 25 to the people as the people making and receiving</p>	<p style="text-align: right;">Page 37</p> <p>1 Q. Is that opinion in your declaration? 2 A. Again, this was not one of the -- one 3 of the four terms that I was asked to assume 4 constructions for. "M-connect" is one of those 5 four terms, but "connected" by itself is not. 6 And so I assigned it the plain and ordinary 7 meaning.</p> <p>8 Q. What is the plain and ordinary meaning 9 of the term "connected" as it's used in Claim 6 10 of the '147 patent?</p> <p>11 A. So there are several uses of the term 12 "connected" in Claim 6. Are you asking about all 13 of them?</p> <p>14 Q. Let's start with the one in the phrase 15 "the computers being connected to a broadcast 16 channel."</p> <p>17 A. Yeah. So my understanding of 18 "connected" in that context is that the computers 19 have access to the broadcast channel, are able to 20 send messages or -- and/or receive messages 21 through that broadcast channel.</p> <p>22 Q. And the broadcast channel was an 23 overlay. Correct?</p> <p>24 A. It is a channel overlaying -- well, 25 let's see. Again, Claim 6 does not use the term</p>

<p style="text-align: right;">Page 38</p> <p>1 "overlay" and certainly does not say that the 2 broadcast channel is an overlay. 3 In fact, what it says is "the broadcast 4 channel being an m-regular graph." The plain and 5 ordinary reading of what it's saying is that that 6 m-regular graph is being used as a broadcast 7 channel. In that sense, one could say that the 8 broadcast channel overlays the m-regular graph. 9 Q. What is your understanding of the 10 meaning of the term "connected" as it's used in 11 the phrase "having a third computer not already 12 connected to said first computer"? 13 A. So this is an understanding which is 14 informed by the specification, because the 15 specification describes this process of forming 16 these m-regular graphs by identifying certain 17 pairs of computers as neighbors. 18 And so when it talks about "a computer not 19 already connected to the first computer," it 20 means a computer where we have not already 21 assigned them to be neighbors in the network. 22 Q. What do you mean by the term 23 "neighbors"? 24 A. Well, I recognize that it's somewhat 25 circular, but this is sort of a graph theoretic</p>	<p style="text-align: right;">Page 39</p> <p>1 concept. When you have a graph, the graph 2 involves edges that are -- that describe pairs of 3 nodes that are connected to one another, and 4 those connected nodes are referred to as 5 "neighbors." 6 MR. MURRAY: Break? 7 MR. PRICE: Five minutes. 8 THE WITNESS: Sure. A break in five 9 minutes or take a five-minute break? 10 MR. PRICE: In five minutes. 11 (Discussion off the record.) 12 BY MR. PRICE: 13 Q. Okay. So can you please turn to 14 Page 27 of your declaration. 15 A. Page or paragraph? 16 Q. Page. 17 (Witness complies.) 18 A. Mm-hmm. 19 Q. Do you see Footnote 4? 20 A. Mm-hmm. 21 Q. Are these the type of connections you 22 were just discussing? 23 A. Yes, they are. 24 Q. So in graph theory, a "connection" 25 generally refers to a direct connection between</p>	<p style="text-align: right;">Page 40</p> <p>1 nodes? 2 A. Yes. To be clear, the language is 3 somewhat ambiguous to somebody who is not a 4 plain -- not a person of ordinary skill, but we 5 will sometimes refer to nodes being connected 6 when we mean connected by a path, a series of 7 edges, even if they are not directly connected. 8 However, in this context, we've -- I have 9 attempted to refrain from that use and use the 10 term "connected" to refer to a direct connection. 11 That is an actual edge. 12 Q. Okay. So do you understand the term 13 "connected," as it's used in that last element of 14 Claim 6, to refer to a direct connection? 15 A. Yes. 16 MR. PRICE: Okay. And we can go off, 17 take a break. 18 THE VIDEOGRAPHER: We are going off the 19 record at 10:24 a.m., and this will mark the end 20 of Disk 1 of today's deposition. We're off the 21 record. 22 (A recess was taken.) 23 THE VIDEOGRAPHER: The time now is 24 10:51 a.m. We are coming back on the record. 25 This begins Disk 2 of our deposition with</p>	<p style="text-align: right;">Page 41</p> <p>1 Dr. David Karger. We're on the record. 2 BY MR. PRICE: 3 Q. Dr. Karger, are you familiar with the 4 Shoubridge reference? 5 A. Yes, I am. 6 Q. What do you understand the Shoubridge 7 reference to teach? 8 A. Well, if we're going to be discussing 9 the Shoubridge reference, I'd like to have a 10 copy. 11 MR. PRICE: Sure. The court reporter 12 is going to hand you Exhibit No. 3. 13 (Article entitled "Hybrid 14 Routing in Dynamic Networks" marked 15 Exhibit 3.) 16 THE WITNESS: Oh, that's small. 17 MR. MURRAY: I'll take one. 18 THE WITNESS: Do we have a magnifying 19 glass? 20 BY MR. PRICE: 21 Q. Do you recognize this exhibit? 22 A. Yes, I do. 23 Q. This was an article called "Hybrid 24 Routing in Dynamic Networks" by Peter Shoubridge 25 and Arek Dadej, submitted as Exhibit 1005 in</p>
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<p style="text-align: right;">Page 42</p> <p>1 IPR2006-00747. Is that correct?</p> <p>2 A. That's correct.</p> <p>3 Q. What do you understand this reference</p> <p>4 to teach?</p> <p>5 A. Well, generally speaking, this</p> <p>6 reference addresses a variety of techniques for</p> <p>7 broadcasting messages or for delivering messages</p> <p>8 to participants in communication networks.</p> <p>9 It considers issues of change in the</p> <p>10 network, dynamic networks, nodes and links</p> <p>11 failing and recovering. It discusses flooding, a</p> <p>12 well-known technique for using a network as a</p> <p>13 broadcast channel. And it compares the</p> <p>14 performance of a number of different routing</p> <p>15 algorithms on a grid network.</p> <p>16 Q. What are "routing algorithms"?</p> <p>17 A. Well, speaking broadly, a routing</p> <p>18 algorithm is just an algorithm for getting a</p> <p>19 packet of information from its source to its</p> <p>20 recipients, one or many.</p> <p>21 Q. And you understand Shoubridge to teach</p> <p>22 one or more routing algorithms?</p> <p>23 A. Among the things that Shoubridge</p> <p>24 teaches are methods for routing messages to</p> <p>25 participants in communication networks. He also</p>	<p style="text-align: right;">Page 44</p> <p>1 delivery of traffic from a single source to a</p> <p>2 single recipient. That is sort of the goal that</p> <p>3 he has in mind for routing.</p> <p>4 When he refers to "routing by flooding," he</p> <p>5 is observing that if you use flooding, which is a</p> <p>6 broadcast technique which gets information to</p> <p>7 every node in a network, it will, of course, get</p> <p>8 the information to the intended recipient of that</p> <p>9 information.</p> <p>10 Q. Shoubridge mentions the term "flood</p> <p>11 search routing" on the bottom of Page 1382. Is</p> <p>12 that the same concept you were just referring to?</p> <p>13 A. Yes. So the flood search routing that</p> <p>14 is discussed in the bottom of Page 1382 is that</p> <p>15 general flooding procedure that I already</p> <p>16 described.</p> <p>17 Q. Can you refer to the first full</p> <p>18 paragraph in that same column.</p> <p>19 A. On 1382?</p> <p>20 Q. Mm-hmm.</p> <p>21 A. Yes.</p> <p>22 Q. Do you see where it says "routing</p> <p>23 algorithms are executed in each of the N nodes in</p> <p>24 G"?</p> <p>25 A. Yes, I do.</p>
<p style="text-align: right;">Page 43</p> <p>1 teaches "broadcast," which it might be referred</p> <p>2 to as a "routing algorithm," but probably not.</p> <p>3 It's more just a way of getting information</p> <p>4 to everybody in the network.</p> <p>5 Q. Where does Shoubridge disclose</p> <p>6 "broadcasting"?</p> <p>7 A. Well, he discloses a broadcasting</p> <p>8 protocol called "flooding" in which a node sends</p> <p>9 a message to all of its neighbors, and each</p> <p>10 neighbor, upon receiving a message for the first</p> <p>11 time, broadcasts the message to all of its</p> <p>12 neighbors, except for the one from which it</p> <p>13 received the message.</p> <p>14 Q. Can you please refer to, I guess</p> <p>15 page -- we'll go with the Shoubridge page</p> <p>16 numbers. I think it will be easier. 1381 in the</p> <p>17 right column, first full paragraph.</p> <p>18 A. Yes.</p> <p>19 Q. What does Shoubridge mean here when he</p> <p>20 says "routing by flooding"?</p> <p>21 A. Sorry. Could you restate the question.</p> <p>22 Q. What does Shoubridge mean by the term</p> <p>23 "routing by flooding"?</p> <p>24 A. Well, in his introduction, Shoubridge</p> <p>25 is generally referring to "routing" as the</p>	<p style="text-align: right;">Page 45</p> <p>1 Q. What does that sentence mean to you?</p> <p>2 A. So "routing algorithms" here is used in</p> <p>3 the phrase -- in the sense of -- actually, hold</p> <p>4 on.</p> <p>5 Sorry. The question again?</p> <p>6 Q. What does the first sentence in the</p> <p>7 first full paragraph, second column of 1382, mean</p> <p>8 to you?</p> <p>9 A. "Routing algorithms are executed in</p> <p>10 each of the N nodes in G"?</p> <p>11 Q. Yes.</p> <p>12 A. So this is describing one of several</p> <p>13 routing methods that are considered in the</p> <p>14 Shoubridge article. At this point in the paper,</p> <p>15 they're talking about a shortest path-based</p> <p>16 routing procedure known as Jaffe-Moss, I believe.</p> <p>17 In this routing procedure, nodes exchange</p> <p>18 information in order to compute shortest paths</p> <p>19 between any source and any destination in the</p> <p>20 network, which allows routing to deliver a packet</p> <p>21 by moving it along those shortest paths.</p> <p>22 And so what this sentence is saying is that</p> <p>23 these -- that all of these nodes are executing</p> <p>24 this routing algorithm so that you can send from</p> <p>25 any source to any destination.</p>

<p style="text-align: right;">Page 46</p> <p>1 Q. Does the shortest hop under the</p> <p>2 minimum-hop, shortest-path algorithm use routing</p> <p>3 tables?</p> <p>4 A. The shortest-hop algorithm, which is --</p> <p>5 that is the Jaffe-Moss algorithm described here,</p> <p>6 does use routing tables.</p> <p>7 Q. What are "routing tables"?</p> <p>8 A. Well, as used in this reference,</p> <p>9 routing tables provide information about what to</p> <p>10 do with a received packet. In particular, given</p> <p>11 the destination of that received packet, they</p> <p>12 will tell you which outgoing link or links</p> <p>13 should -- you should forward that packet on in</p> <p>14 order to move it towards its ultimate destination</p> <p>15 or destinations.</p> <p>16 Q. Previously, we were talking about the</p> <p>17 term "direct connection" that you use in your</p> <p>18 declaration in Footnote 4 --</p> <p>19 A. Yes.</p> <p>20 Q. -- on Page 27.</p> <p>21 A. Mm-hmm.</p> <p>22 Q. Does Shoubridge teach a graph with</p> <p>23 direct connections?</p> <p>24 A. Yes, he does.</p> <p>25 Q. Where does Shoubridge teach a graph of</p>	<p style="text-align: right;">Page 48</p> <p>1 in Shoubridge here to be modeling physical links?</p> <p>2 A. Well, by physical -- so, again, this is</p> <p>3 a simulation. So what it is -- its model is</p> <p>4 or -- what it is -- that simulation model has no</p> <p>5 physical links.</p> <p>6 The network being modeled would most likely</p> <p>7 have physical links. It does not necessarily</p> <p>8 mean that it has links made of matter.</p> <p>9 Shoubridge is actually interested in</p> <p>10 networks that can be created through wireless</p> <p>11 connections. But I mean, you could implement</p> <p>12 your -- you could implement your network either</p> <p>13 way.</p> <p>14 You could also implement it as an overlay</p> <p>15 network, for that matter, where the links would</p> <p>16 be virtual.</p> <p>17 Q. But Shoubridge doesn't disclose an</p> <p>18 overlay network. Correct?</p> <p>19 A. Does Shoubridge disclose an overlay</p> <p>20 network? So I'll point out, once again, that</p> <p>21 none of the claim numbers at issue today make</p> <p>22 reference to an overlay network.</p> <p>23 Shoubridge does not -- and so it wasn't</p> <p>24 necessary for this declaration to draw that</p> <p>25 conclusion about whether they -- about whether</p>
<p style="text-align: right;">Page 47</p> <p>1 direct connections?</p> <p>2 A. On Page 1383 of Shoubridge, the first</p> <p>3 full paragraph, Shoubridge observes that "a</p> <p>4 64-node network with connectivity of degree 4 is</p> <p>5 modeled as G. The network is a large regular</p> <p>6 graph forming a Manhattan grid network that has</p> <p>7 been wrapped around itself as a tourist to avoid</p> <p>8 edge effects."</p> <p>9 So this description, a person of ordinary</p> <p>10 skill would understand the network that is being</p> <p>11 described by Shoubridge to have these direct</p> <p>12 connections between neighboring nodes.</p> <p>13 Q. And Shoubridge refers to those</p> <p>14 connections as "links." Is that correct?</p> <p>15 A. Yes.</p> <p>16 Q. Would a person of ordinary skill in the</p> <p>17 art understand a "link" to refer to a physical</p> <p>18 connection?</p> <p>19 (Discussion off the record.)</p> <p>20 A. So what Shoubridge is describing here</p> <p>21 is a simulation model. And so that simulation is</p> <p>22 most likely done in software, without physical</p> <p>23 links. But it is understood as modeling a</p> <p>24 network that could very well have physical links.</p> <p>25 Q. Do you understand the model disclosed</p>	<p style="text-align: right;">Page 49</p> <p>1 Shoubridge discloses an overlay network. At the</p> <p>2 same time, Shoubridge does disclose this grid</p> <p>3 network in simulation.</p> <p>4 A person of ordinary skill would have</p> <p>5 understood this network could be physical, could</p> <p>6 be wireless, would also have been aware of the</p> <p>7 practice of overlaying the X25 protocol over</p> <p>8 TCP/IP, which would be -- which would produce an</p> <p>9 overlay network using Shoubridge's -- using</p> <p>10 Shoubridge's network.</p> <p>11 So all of those things are disclosed within</p> <p>12 Shoubridge.</p> <p>13 Q. You didn't point to me any disclosure</p> <p>14 in Shoubridge of an overlay network, though.</p> <p>15 Correct?</p> <p>16 A. Well, I didn't point you to the words</p> <p>17 "overlay network," because Shoubridge does not</p> <p>18 use those words. I did describe what a person of</p> <p>19 ordinary skill would have understood.</p> <p>20 Q. Does Shoubridge teach implementing the</p> <p>21 X25 protocol over TCP/IP?</p> <p>22 A. Well, Shoubridge doesn't need to teach</p> <p>23 it, because a person of ordinary skill would have</p> <p>24 been aware of that methodology.</p> <p>25 Q. In the year 2000?</p>

<p>Page 50</p> <p>1 A. Yes. X25 was already old by then, and</p> <p>2 it was recognized that there would be a need to</p> <p>3 take legacy systems over to TCP/IP. There was --</p> <p>4 there was some RFC out already, describing</p> <p>5 that -- that process.</p> <p>6 Q. Which RFC was it?</p> <p>7 A. Oh, I don't remember the number.</p> <p>8 Q. Can you please refer to the second full</p> <p>9 paragraph on Page 1382, Column 2.</p> <p>10 A. Column 2. Yes.</p> <p>11 Q. What does Shoubridge mean here by "link</p> <p>12 cost change events"?</p> <p>13 A. Sorry. Could you restate the question.</p> <p>14 Q. What are "link cost change events"?</p> <p>15 A. So link costs, in general, are sort of</p> <p>16 an abstract measure of the quality of a link. As</p> <p>17 you can see in the first paragraph of the second</p> <p>18 column of Page 1382, Shoubridge discussed how if</p> <p>19 link cost functions reflect both connectivity and</p> <p>20 delay, then minimum delay routing can be employed</p> <p>21 to enhance performance.</p> <p>22 So there are -- sort of, you know, the most</p> <p>23 fundamental issue of a link is just whether the</p> <p>24 link is available or not, whether it can carry</p> <p>25 traffic at all. But you may wish to sort of</p>	<p>Page 52</p> <p>1 nodes from the graph?</p> <p>2 A. Well, I guess it's sort of a matter of</p> <p>3 interpretation. If all of the links incident on</p> <p>4 a node fail, then essentially that node is</p> <p>5 removed from the graph because nobody else can</p> <p>6 talk to it anymore.</p> <p>7 So, in that sense, he does have as a case in</p> <p>8 his simulation the removal of a node.</p> <p>9 Q. But that would be predicated on, for</p> <p>10 example, link failure, all of the links failing?</p> <p>11 A. Yeah. That would have an equivalent</p> <p>12 effect. Right. If the node fails, nobody can</p> <p>13 talk to it. If all the links coming into the</p> <p>14 node fail, nobody can talk to it.</p> <p>15 Q. Do you have an understanding of</p> <p>16 networks with fixed topology versus networks with</p> <p>17 dynamic topology?</p> <p>18 A. Well, I think it's worth pointing out</p> <p>19 what Shoubridge says is that G has essentially</p> <p>20 fixed topology. And, in fact, goes on in the</p> <p>21 next sentence to talk about topology change being</p> <p>22 modeled by having link quality changing between</p> <p>23 one of two possible states.</p> <p>24 So Shoubridge's network is not a, literally,</p> <p>25 "fixed topology network," which I guess would</p>
<p>Page 51</p> <p>1 refine further and talk about whether the link is</p> <p>2 highly congested, will, therefore, cause a large</p> <p>3 delay in transmission.</p> <p>4 If that's the case, you might assign a high</p> <p>5 cost to that link in order to discourage the</p> <p>6 shortest-path algorithm from making use of it.</p> <p>7 Q. What does it mean for the graph to have</p> <p>8 "essentially fixed topology with links always</p> <p>9 existing between nodes and their respective</p> <p>10 neighbors"?</p> <p>11 A. So I think what Shoubridge is talking</p> <p>12 about here is a way that he sort of simplified</p> <p>13 his simulation work.</p> <p>14 Again, the purpose of this article was to</p> <p>15 run a simulation in order to assess the quality</p> <p>16 of various routing algorithms. And what he is</p> <p>17 saying here is that he is going -- in his</p> <p>18 simulation, he's going to stick to that sort of</p> <p>19 overlying -- that overall grid topology.</p> <p>20 He is only going to have those edges fail or</p> <p>21 come back, and he's not going to introduce other</p> <p>22 edges in the simulation, which most likely</p> <p>23 simplified his implementation of that simulation.</p> <p>24 Q. So is it fair to say that the --</p> <p>25 Shoubridge's simulation doesn't add or remove</p>	<p>Page 53</p> <p>1 mean that there is no change at all in what links</p> <p>2 are present.</p> <p>3 He's simply saying that the topology change</p> <p>4 that he has chosen to model is a sort of</p> <p>5 restricted kind of topology change, where all</p> <p>6 that happens is the links that were initially</p> <p>7 present may fail and return.</p> <p>8 Q. And I believe you said before that</p> <p>9 Shoubridge does not consider the possibility of</p> <p>10 defining new links. Correct?</p> <p>11 A. In Shoubridge's simulation, he</p> <p>12 restricts to the restoration of links that were</p> <p>13 previously present. I mean, in a sense, those</p> <p>14 are new links.</p> <p>15 Certainly Shoubridge does not, in his --</p> <p>16 Q. Right.</p> <p>17 A. -- this is a single simulation of a</p> <p>18 general concept, and it is understood that in</p> <p>19 networks, in general, links may come. Links may</p> <p>20 be added that were not previously present.</p> <p>21 MR. PRICE: Dr. Karger, the court</p> <p>22 reporter is going to hand you Exhibit No. 4.</p> <p>23 (Article entitled "'Evolution'</p> <p>24 by vertex of even-order regular graphs"</p> <p>25 marked Exhibit 4.)</p>

<p>Page 54</p> <p>1 BY MR. PRICE:</p> <p>2 Q. Do you recognize this document,</p> <p>3 Dr. Karger?</p> <p>4 A. Yes. This is a translation of an</p> <p>5 article by Dénes on the -- on methods for</p> <p>6 evolving graphs, as nodes are added or removed.</p> <p>7 Q. Okay. This was -- the article is ^{more}</p> <p>8 called "'Evolution' by vertex of even-order</p> <p>9 regular graphs," a translation?</p> <p>10 A. Yes. Yes. ^{more}</p> <p>11 Q. It was submitted as Exhibit 1017 in</p> <p>12 this case. Correct?</p> <p>13 A. Correct.</p> <p>14 Q. Is it fair to say that this reference</p> <p>15 is concerned with graph theory?</p> <p>16 A. Yes, it is.</p> <p>17 Q. Have you taught any courses on graph</p> <p>18 theory?</p> <p>19 A. They make up a good part of some of the</p> <p>20 algorithms courses that I teach. Yes.</p> <p>21 Q. What is "graph theory"?</p> <p>22 A. Well, graph theory is the mathematics</p> <p>23 that provides the theoretical underpinnings for</p> <p>24 studying networks, such as the ones under</p> <p>25 consideration today.</p>	<p>Page 56</p> <p>1 edges that go through a pair -- that go through</p> <p>2 some other node. If you'll hang on a second.</p> <p>3 Sorry to pause mid answer, but there's something</p> <p>4 that I wanted to point out.</p> <p>5 Yeah. This is, I believe, essentially the</p> <p>6 same as the procedure referred to as "edge</p> <p>7 pinning" in the patent.</p> <p>8 Q. And where are you referring to?</p> <p>9 A. That's what I'm trying to find. Ah.</p> <p>10 This is in Column 6, first paragraph. "The</p> <p>11 process of breaking the connection between two</p> <p>12 neighbors and reconnecting each of the former</p> <p>13 neighbors to another computer is referred to as</p> <p>14 'edge pinning,' as the edge between two nodes may</p> <p>15 now be considered to be stretched and pinned to a</p> <p>16 new node." And that is what the EC</p> <p>17 transformation is doing.</p> <p>18 Q. Do you see the ET to the minus 1</p> <p>19 transformation on Page 366?</p> <p>20 A. Yes, I do.</p> <p>21 Q. Can you please explain this</p> <p>22 transformation?</p> <p>23 A. Well, this transformation is a</p> <p>24 procedure for removing a vertex from a graph.</p> <p>25 It's the inverse of the ET transformation on the</p>
<p>Page 55</p> <p>1 Q. So you agree that graph theory applies</p> <p>2 to the subject matter claimed in the '147 patent?</p> <p>3 A. I do.</p> <p>4 Q. Is it fair to say that Dénes is</p> <p>5 concerned with performing transformations on</p> <p>6 graphs?</p> <p>7 A. Yes.</p> <p>8 Q. What does it mean to "transform a</p> <p>9 graph"?</p> <p>10 A. Well, he's describing ways of modifying</p> <p>11 a graph, changing it into another graph, by</p> <p>12 adding more or removing nodes and edges.</p> <p>13 Q. Does Dénes disclose sending messages</p> <p>14 between nodes of graphs?</p> <p>15 A. I don't recall him doing so. I doubt</p> <p>16 it.</p> <p>17 Q. Do you see the description of the EC</p> <p>18 transformation on Page 365? And I'm going to</p> <p>19 refer to the inlaid page numbers.</p> <p>20 A. Yes, I do.</p> <p>21 Q. Can you explain what is happening in</p> <p>22 this transformation?</p> <p>23 A. Sure. The EC transformation is a</p> <p>24 transformation of a graph which removes an edge</p> <p>25 from the graph and replaces it with a pair of</p>	<p>Page 57</p> <p>1 previous page for adding a vertex to a graph.</p> <p>2 If you're going to remove a vertex, you have</p> <p>3 to decide what to do with the edges that are</p> <p>4 incident on that vertex. And the ET inverse</p> <p>5 transformation says that you take the neighbors</p> <p>6 of that vertex, the K neighbors of that vertex,</p> <p>7 and you join pairs of those neighbors.</p> <p>8 So this is sort of unpinning the edges.</p> <p>9 It's the reverse of the pinning procedure. It</p> <p>10 sort of matches up pairs of neighbors and creates</p> <p>11 an edge between each of those pairs of neighbors.</p> <p>12 This ensures that the degree of each of</p> <p>13 those neighbors is left unchanged. And this,</p> <p>14 again, is essentially the procedure described in</p> <p>15 the patent for how to deal with the departure of</p> <p>16 a node.</p> <p>17 Q. Can you refer to theorem 2 on Page 3 of</p> <p>18 6.</p> <p>19 A. Yes, I can.</p> <p>20 Q. Do you see where it says, "This ET to</p> <p>21 the minus 1 transformation can be applied to a</p> <p>22 graph if and only if there exists a</p> <p>23 T-characterized vertex P"?</p> <p>24 A. Yes.</p> <p>25 Q. In the graph?</p>

<p>Page 58</p> <p>1 A. Yes, I do.</p> <p>2 Q. What does that mean?</p> <p>3 A. Well, it means what it says, that so</p> <p>4 long as there is a T-characterized vertex, it is</p> <p>5 possible to apply this transformation to that</p> <p>6 T-characterized vertex. If there is no</p> <p>7 T-characterized vertex, then it is not possible</p> <p>8 to apply this transformation.</p> <p>9 MR. PRICE: The court reporter is going</p> <p>10 to hand you Exhibit No. 5.</p> <p>11 (Article entitled "A Study on</p> <p>12 the Inaccessibility Characteristics of ISO</p> <p>13 8802/4 Token-Bus LANs" marked Exhibit 5.)</p> <p>14 BY MR. PRICE:</p> <p>15 Q. Do you recognize this document,</p> <p>16 Dr. Karger?</p> <p>17 A. Yes, I do.</p> <p>18 Q. It is titled "A Study on the</p> <p>19 Inaccessibility Characteristics of ISO 8802/4</p> <p>20 Token-Bus LANs."</p> <p>21 A. Mm-hmm.</p> <p>22 Q. I believe this is the reference that is</p> <p>23 being referred to as the "Rufino reference"?</p> <p>24 A. Correct.</p> <p>25 Q. It was submitted as Exhibit 1011 in</p>	<p>Page 60</p> <p>1 becomes faulty, you can continue to work the</p> <p>2 other one.</p> <p>3 Q. Do you see the term "token-bus LAN" at</p> <p>4 the end of the abstract?</p> <p>5 A. Yes, I do.</p> <p>6 Q. Do you understand what the term</p> <p>7 "token-bus" refers to here?</p> <p>8 A. So as you can see in Section 3 of the</p> <p>9 Rufino reference, the token-passing bus is a</p> <p>10 local area network which has gathered growing</p> <p>11 attention and has been selected for use in the</p> <p>12 manufacturing automation protocol, which is used</p> <p>13 to interconnect devices in factories.</p> <p>14 It is a system/protocol in which a logical</p> <p>15 ring is established over a physical bus, physical</p> <p>16 network. That logical ring is used to manage</p> <p>17 access to the shared broadcast medium provided by</p> <p>18 the physical bus.</p> <p>19 Q. So would you characterize Rufino as</p> <p>20 being about token-bus networks?</p> <p>21 A. As being about token-bus networks? I</p> <p>22 mean, that is the -- that is the focus of his</p> <p>23 attention.</p> <p>24 Q. Would you agree that a token-bus</p> <p>25 network is a local area network formed in a bus</p>
<p>Page 59</p> <p>1 this case. Correct?</p> <p>2 A. Yes.</p> <p>3 Q. Are you familiar with this reference?</p> <p>4 A. Yes, I am.</p> <p>5 Q. What do you understand the Rufino</p> <p>6 reference to teach?</p> <p>7 A. Well, Rufino teaches a mechanism for</p> <p>8 overlaying a token ring on a local area network.</p> <p>9 This provides a particular protocol to manage</p> <p>10 communications between a collection of nodes</p> <p>11 sharing a local area network.</p> <p>12 Q. What is a local area network?</p> <p>13 A. A local area network, generally</p> <p>14 speaking, is a network for a set of computers</p> <p>15 that are in a -- in a small, local area.</p> <p>16 Q. Can you refer to the abstract of the</p> <p>17 paper?</p> <p>18 A. Yes.</p> <p>19 Q. What is a "nonreplicated local area</p> <p>20 network"? It's on the second paragraph of the</p> <p>21 abstract.</p> <p>22 A. Well, a nonreplicated LAN is a LAN that</p> <p>23 is not replicated. In other words, a replicated</p> <p>24 LAN is one where you might install two identical</p> <p>25 local area networks so that if one of them</p>	<p>Page 61</p> <p>1 topology?</p> <p>2 A. Well, again, a token-bus network is</p> <p>3 actually an overlay network of sorts. It is a</p> <p>4 network which overlays -- sorry, it is a system</p> <p>5 which overlays a ring-shaped network over a --</p> <p>6 over a bus.</p> <p>7 Q. So there are two components to a</p> <p>8 token-bus network: A physical component and a</p> <p>9 logical overlay?</p> <p>10 A. That's correct.</p> <p>11 Q. And the physical component is a bus</p> <p>12 topology in which stations are connected to a</p> <p>13 single shared data highway?</p> <p>14 A. So I'm not sure of all of the details</p> <p>15 of the token-bus specification. There is a</p> <p>16 specification, ISO 8802. That specification may</p> <p>17 require a physical broadcast network, but all</p> <p>18 that's really needed in order to provide the --</p> <p>19 in order to implement the ideas of Rufino is an</p> <p>20 underlying broadcast channel that -- that logical</p> <p>21 ring is defined, and the operations that need to</p> <p>22 be performed are defined by relying on some</p> <p>23 underlying broadcast primitive.</p> <p>24 That broadcast primitive can be provided by</p> <p>25 a physical bus. You could provide it using any</p>

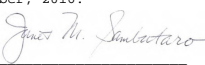
<p>Page 62</p> <p>1 other broadcast channel if you wished.</p> <p>2 Q. Yeah. I'm asking about how Rufino</p> <p>3 implements its token-bus network.</p> <p>4 A. Well, again, Rufino is analyzing the</p> <p>5 behavior of a token-bus network under a variety</p> <p>6 of errors and describing mechanisms for</p> <p>7 recovering from a variety of faults. Those</p> <p>8 methods could apply anywhere you had an</p> <p>9 underlying broadcast channel.</p> <p>10 Certainly, what he describes is a logical</p> <p>11 ring implemented over a physical bus. But a</p> <p>12 person of ordinary skill reading this would have</p> <p>13 understood that any broadcast channel with</p> <p>14 certain time limits on the time it takes to</p> <p>15 broadcast could be used as the underlying</p> <p>16 broadcast channel on which to apply Rufino's</p> <p>17 ideas.</p> <p>18 THE WITNESS: If we can squeeze in a</p> <p>19 short break at some point, that would be great.</p> <p>20 MR. PRICE: I'm okay with a break now.</p> <p>21 THE WITNESS: Okay.</p> <p>22 THE VIDEOGRAPHER: The time is</p> <p>23 11:41 a.m. We're going off the record.</p> <p>24 (A recess was taken.)</p> <p>25 THE VIDEOGRAPHER: The time is 11:58.</p>	<p>Page 64</p> <p>1 broadcast, which means that if one node</p> <p>2 transmits, then all nodes will directly receive</p> <p>3 that transmission. And so, in that sense, I</p> <p>4 would probably characterize those nodes as being</p> <p>5 directly connected through the bus.</p> <p>6 But just to be clear, that this is -- that,</p> <p>7 again, we haven't defined a graph, and so there</p> <p>8 are not necessarily edges to be discussed in the</p> <p>9 context of that direct connection.</p> <p>10 Q. Is it unreasonable to envision a graph</p> <p>11 of stations connected to a bus?</p> <p>12 A. Well, you could define a graph</p> <p>13 describing the connections of stations to the</p> <p>14 bus. That graph might, for example, be some sort</p> <p>15 of tree shape representing the physical wires</p> <p>16 that make up the bus. But it's then worth noting</p> <p>17 that in that graph, you would no longer</p> <p>18 necessarily say that nodes are directly connected</p> <p>19 to each other, because now the bus has been sort</p> <p>20 of unpacked as a tree of individual wires. And</p> <p>21 so in that graph, the connections would no longer</p> <p>22 be direct.</p> <p>23 Q. Are there other shapes, other than a</p> <p>24 tree, that you could envision a -- the stations</p> <p>25 connected to a physical bus being laid out in a</p>
<p>Page 63</p> <p>1 We're back on the record.</p> <p>2 BY MR. PRICE:</p> <p>3 Q. Would you agree that a token-bus</p> <p>4 network uses token passing to regulate traffic on a</p> <p>5 shared data bus?</p> <p>6 A. A token-bus network uses a token to</p> <p>7 regulate traffic on a shared data bus? Yes, that</p> <p>8 is its intention.</p> <p>9 Q. In a token-bus network, would you</p> <p>10 characterize the stations as being connected via</p> <p>11 the bus?</p> <p>12 A. Yes, I would.</p> <p>13 Q. Would you characterize the stations as</p> <p>14 being directly connected via the bus?</p> <p>15 A. So, to be clear, in regards to the</p> <p>16 footnote that we discussed previously, we talked</p> <p>17 about direct connections. That was in sort of a</p> <p>18 graph theoretic context about, talking about</p> <p>19 which nodes are connected by an edge.</p> <p>20 You've now asked me about whether nodes in</p> <p>21 the token-bus network are directly connected.</p> <p>22 There isn't really a graph yet, if we're just</p> <p>23 talking about the bus.</p> <p>24 The bus does allow any two nodes to</p> <p>25 communicate directly because the bus provides</p>	<p>Page 65</p> <p>1 graph?</p> <p>2 MR. MURRAY: Object to the form.</p> <p>3 A. Yeah. I believe there are other bus</p> <p>4 structures that are used. A ring is a popular</p> <p>5 shape for a bus, because it allows a failure to</p> <p>6 occur without disrupting communication over the</p> <p>7 bus, for example.</p> <p>8 Q. Can you refer to Paragraph 113 of your</p> <p>9 declaration.</p> <p>10 (Witness complies.)</p> <p>11 A. Yes.</p> <p>12 Q. Will you please explain what you mean</p> <p>13 by -- I'm sorry, what is meant by "access</p> <p>14 control" in your first citation?</p> <p>15 A. So this is referring to Rufino,</p> <p>16 Page 959, Column 2, Paragraph 1. Rufino is the</p> <p>17 one who says that "access control is performed by</p> <p>18 a token-passing protocol which establishes a</p> <p>19 logical ring over the physical bus," and he</p> <p>20 elaborates by explaining that "access to the</p> <p>21 shared broadcast medium" -- and again he makes</p> <p>22 this -- he uses this language of "shared</p> <p>23 broadcast medium," that it almost doesn't matter</p> <p>24 exactly how that channel, that medium is</p> <p>25 implemented.</p>

<p style="text-align: right;">Page 66</p> <p>1 What he's going to be describing would work 2 over any such broadcast medium. But, in any 3 case, access to the shared broadcast medium for 4 data transmission is only granted to the station 5 which currently holds the token. 6 In other words, only the token holder is 7 permitted to use that medium in order to 8 broadcast. 9 Q. Is it your opinion that Rufino 10 discloses a broadcast channel? 11 A. Yes, it is. 12 Q. And what in Rufino would correspond to 13 the claimed broadcast channel? 14 A. Well, so actually Rufino discloses two 15 broadcast channels. The underlying physical bus 16 is a broadcast channel, and the token-bus itself 17 is another broadcast channel, which overlays the 18 underlying physical bus. 19 Q. Can you turn to Paragraph 118, please. 20 A. Of my declaration? 21 Q. Of your declaration. 22 (Witness complies.) 23 A. Yes. 24 Q. You state that, "Rufino discloses a 25 station broadcasts a connection port search</p>	<p style="text-align: right;">Page 68</p> <p>1 to tell them who their new successor should be. 2 Right. 3 More generally, you know, a very large 4 number of the messages described in Rufino are 5 broadcast on the physical bus. 6 Q. Is the "who follows" query sent on the 7 physical bus? 8 A. Yes. There is a "who follows" query 9 that is transmitted on the physical bus. 10 Q. In a token-bus network, does every 11 station that is connected to the bus receive 12 every message that is sent on the bus? 13 A. Well, that's the ideal preferred 14 theoretical operation. Rufino describes a number 15 of circumstances in which, you know, that may not 16 happen. For example, a temporary partition. 17 Q. Do you understand there to be a 18 difference between a token-bus network and a 19 token ring network? 20 A. Well, in a sense as described in 21 Rufino, a token-bus network is a sort of an -- an 22 overlay of a virtual token ring network onto a 23 bus. So, yes, one can draw a distinction between 24 a physical token ring network and a virtual token 25 ring network, but they are both token rings, and</p>
<p style="text-align: right;">Page 67</p> <p>1 message on the broadcast channel to find a third 2 computer." Is that correct? 3 A. Mm-hmm. 4 Q. Where in Rufino is it disclosed that a 5 station broadcasts a connection port search 6 message on a broadcast channel? 7 A. I'm sorry. Could we repeat the 8 question. 9 Q. Where in Rufino is it disclosed that a 10 station broadcasts a connection port search 11 message on a broadcast channel? 12 A. Well, so, for example, on Page 963, 13 first column, first paragraph, Rufino describes a 14 process for handling the absence of a successor. 15 After the token pass period has elapsed, a 16 recovery strategy is tried. This includes the 17 repetition of token transmission, followed by a 18 variant of the solicit successor procedure. 19 During this "who follows" query, the current 20 token holder waits for a "set successor" frame 21 until the end of a three-slot time period. 22 So what is being described here is a -- is 23 the node that does not have -- that can't find 24 its successor is awaiting a broadcast of a "set 25 successor" message from their successor in order</p>	<p style="text-align: right;">Page 69</p> <p>1 it's sort of -- a person of ordinary skill sort 2 of understands that they're closely related. 3 Q. Can you give me some distinctions 4 between a token-bus network and a token ring 5 network? 6 A. Well, as we've been discussing, a 7 token-bus uses a logical ring; that is, a virtual 8 ring structure over a physical bus, which, as we 9 discussed before, could be tree shaped, a token 10 ring, as originally -- actually, I'm not sure 11 what the origination of token rings were, but 12 certainly one also talks about physical token 13 ring networks, where that ring is hardware, a 14 piece of hardware, a bunch of nodes that are 15 connected by wires that form a physical ring. 16 Q. Are you familiar with the IEEE 802 17 specifications? 18 A. IEEE 802. It doesn't ring a bell by 19 number. If you want to -- if you can tell me 20 sort of more about the title or what is being 21 specified, I can tell you whether I am familiar 22 with that. 23 Q. Are you familiar with the IEEE 802.4 24 standard that's used for token-bus networks? 25 A. I haven't read it in -- I haven't read</p>

<p>Page 70</p> <p>1 it. I know that the IEEE does standardize a 2 variety of networks. The 802.11, for example, is 3 a standardization of various wireless network 4 protocols.</p> <p>5 Q. So we were talking about token ring 6 networks. Would you characterize a token ring 7 network as a local area network formed in a ring 8 topology that uses token passing as a means of 9 regulating traffic?</p> <p>10 A. That certainly sounds like a token-- 11 like a token ring network. I'm not sure if it is 12 the only possible token ring network.</p> <p>13 Q. So but in token ring networks, the 14 stations are arranged in a physical ring?</p> <p>15 A. Well, in a physical token ring, the 16 stations are arranged in a physical ring. As 17 we've been discussing around Rufino, one can also 18 talk about a logical token ring, in which case 19 the stations need not be arranged in a physical 20 ring.</p> <p>21 Q. All right. So I think when we were 22 talking about Rufino, we were referring to a 23 token-bus network. Is that correct?</p> <p>24 A. Yes. In which a logical ring is 25 established over the bus.</p>	<p>Page 72</p> <p>1 Grid Network" marked Exhibit 6.) 2 BY MR. PRICE: 3 Q. You were just handed an article titled 4 "The Token Grid Network" by Terrence Todd. 5 Do you recognize this document? 6 A. Yes, I do. 7 Q. It was submitted as Exhibit No. 1019 in 8 this case. Is that correct? 9 A. Yes. That's my understanding. 10 Q. Are you familiar with the subject 11 matter of this reference? 12 A. Yes, I am. 13 Q. And can you tell me your understanding 14 of what this reference discloses? 15 A. Well, this reference discloses a token 16 grid network, which is a network that draws 17 heavily from token ring ideas, but shows how 18 those ideas can be applied somewhat more 19 generally in order to improve the throughput and 20 reliability of the token ring. 21 Q. Can you please refer to Page 1, 22 Column 2. 23 A. Yes. 24 Q. The first full paragraph. 25 A. Mm-hmm.</p>
<p>Page 71</p> <p>1 Q. So stations in a token-bus network are 2 connected to a shared bus, and stations in a 3 token ring network are connected to each other in 4 a circular configuration. Is that correct?</p> <p>5 A. Well, again, if you refer to a "token 6 ring," you are referring to a ring-shaped 7 network. However, that ring might be a physical 8 ring or it might be a logical virtual overlay 9 ring. And one can also talk about physical buses 10 or logical buses; i.e., broadcast channels.</p> <p>11 MR. PRICE: All right. I think it's a 12 good time to break for lunch. 13 (Discussion off the record.) 14 THE VIDEOGRAPHER: The time now is 15 12:19 p.m. We are going off the record, and this 16 will end Disk 2 of today's deposition. We are 17 off the record. 18 (Lunch recess was taken.) 19 THE VIDEOGRAPHER: The time now is 20 1:28 p.m. We're coming back on the record. Now 21 begins Disk 3 of today's deposition with 22 Dr. David Karger. We're on the record. 23 MR. PRICE: Dr. Karger, the court 24 reporter is going to hand you Exhibit No. 6. 25 (Article entitled "The Token</p>	<p>Page 73</p> <p>1 Q. Based on this passage, do you 2 understand Todd's token grid network to be an 3 extension of a token ring network or a token-bus 4 network? 5 A. Well, so Todd states that the token 6 grid is a multidimensional extension of the token 7 ring. But, as we've been discussing, the ideas 8 of a token ring can be instantiated in either a 9 physical ring or a logical ring, as in the 10 token-bus described by Rufino. And as a person 11 of ordinary skill in the art would have been 12 aware of this -- of this -- of these multiple 13 possibilities, I would say that the teachings of 14 Todd fit well with either case. 15 Q. Do you see the reference No. 2 in the 16 second sentence of that paragraph? 17 A. Yes, I do. 18 Q. That reference refers to the IEEE 802.5 19 standard for token ring networks. Is that 20 correct? 21 A. Yes, it does. 22 Q. Is there any reference to the 802.4 23 IEEE standard for token-bus networks? 24 A. I mean, I haven't read all 12 25 references in detail to see if any of them</p>

<p style="text-align: right;">Page 74</p> <p>1 discuss token buses. I don't see a reference to 2 the 802.4 standard explicitly listed among the 3 references. 4 Q. Is the procedure for adding stations to 5 a token ring network different than adding 6 stations to a token-bus network? 7 A. Well, if by a token ring network ^{you} 8 mean a physical token ring, then the procedure 9 for adding stations to a physical token ring 10 would involve making physical changes to the ^{token} 11 token ring. 12 On the other hand, in the case of a token 13 bus, you might physically add a station to the 14 bus in order to make it part of the virtual token 15 ring, the overlay token ring that you're creating 16 on top of that bus. Or you might add it 17 logically; that is, there might be a station 18 which was previously physically connected to the 19 bus which you, at some point, choose to add to 20 the logical or to a logical overlay that you are 21 running on top of that bus. 22 Q. When you add a station to a token ring 23 network -- and I'm talking about a physical token 24 ring network -- is it required that successive 25 stations are directly connected to one another</p>	<p style="text-align: right;">Page 76</p> <p>1 A. Yes. 2 Q. What is a MAC address? 3 A. Well, the most common usage is to refer 4 to an address assigned at the physical link layer 5 which identifies a particular device so that you 6 can address messages to that device or see in 7 a -- see in a packet header which device has -- 8 is the originator of a message. MAC stands for 9 media access controller, I think. 10 Q. Is it common to address nodes of a 11 local area network using the MAC address? 12 A. That certainly is one way to address 13 them. For example, in Ethernet, every -- every 14 computer on a local area, on an Ethernet comes 15 with a MAC address. And those MAC addresses are 16 used to direct information to a target recipient. 17 Q. How does a MAC address differ from an 18 IP address? 19 A. Well, both are addresses. They serve 20 to identify a particular endpoint for 21 communication. MAC addresses in Ethernet are 22 generally what are understood to be at the link 23 layer. They're physical. They correspond to a 24 physical network and are addresses that can be 25 accessed at the link layer, whereas IP addresses</p>
<p style="text-align: right;">Page 75</p> <p>1 using the physical connections such that the 2 circle is maintained? 3 A. Is it required that... 4 I mean, in a physical token ring, all the -- 5 all of the stations are physically connected 6 through that token ring structure. And if I add 7 a new node to the token ring, then it will become 8 physically connected as well. 9 Q. Is the procedure for recovering from a 10 failed station different in token-bus networks 11 and token ring networks? 12 A. Well, there are a number of different 13 recovery procedures that one could imagine. 14 Rufino describes a particular recovery mechanism 15 for the token-bus network. Todd describes 16 another recovery mechanism which involves sort of 17 shortcutting a failed station in order to recover 18 from that failure. 19 Those are two different recovery methods. I 20 don't know that I would say that the -- that they 21 have to be different. I mean, there could be 22 recovery methods that you could apply in both 23 cases. 24 Q. Are you familiar with the term "MAC 25 address"?</p>	<p style="text-align: right;">Page 77</p> <p>1 are network-layer addresses and can be used to 2 address devices that are on a different -- are on 3 a different network that are connected through 4 the internet and can be used to deliver -- to 5 deliver packets to these remote devices which are 6 not on the same local area network. But they're 7 both addresses. 8 I mean, addressing is a well-understood 9 concept in networking. And, as we've discussed 10 in other depositions, an address -- the role of 11 an address is to serve as an endpoint for 12 communication, and this happens at many different 13 layers of the networking stack. 14 And can -- with overlay networks, can often 15 be happening at multiple layers of the network 16 stack at the same time. 17 Q. Rufino discloses how stations are added 18 to a token-bus network. Correct? 19 A. Rufino discloses a way to add stations 20 to a token-bus network. Yes. 21 Q. And can you describe that procedure? 22 A. So on Page 960 of the Rufino reference, 23 you can see a section titled "Addition of New 24 Stations." In that section, Rufino describes a 25 procedure, a "solicit successor" procedure,</p>

<p style="text-align: right;">Page 78</p> <p>1 through which a node which holds the token is 2 able to announce that it is prepared to be 3 notified of a new node that wishes to join the 4 ring and become the successor of the current 5 token-holding node. 6 He describes the entire process by which 7 that solicitation for a successor is announced, 8 the stations wishing to join respond, what 9 happens when there are no stations responding, 10 one station, more than one station simultaneously 11 trying to join. 12 Q. What actions does the station that 13 wants to become a ring member take in order to 14 join the ring network? 15 A. Well, in this -- in this section, the 16 successor solicitation procedure is described as 17 having the token-holding process broadcast a 18 message saying that it is prepared to receive a 19 successor, and it then describes how a node that 20 may want to join the network compares its own 21 address to the address of the token holder and 22 the successor of the token holder. And if the 23 joining node identifies its address as being 24 between the token holder and their successor, it 25 responds with a "set successor" message which</p>	<p style="text-align: right;">Page 80</p> <p>1 broadcast channel underlying things, then it 2 would not be necessary for a node wishing to join 3 to identify a particular type or channel number. 4 On the other hand, this procedure could also 5 be used in settings where there are multiple 6 logical broadcast channels, in which case it 7 would be necessary to identify which one you were 8 going to be joining through some type or number 9 identifier for the channel. 10 Q. But is it fair to say that it wouldn't 11 have to identify the physical bus by a channel 12 type or channel instance? 13 A. Well, you could certainly have a node 14 connected to more than one physical bus, in which 15 case it might be necessary to identify the one 16 that you wanted to work with. 17 Q. Dr. Karger, what did you do to prepare 18 for this deposition today? 19 A. I did a lot of rereading of my 20 declaration and the various pieces of prior art 21 that are relevant to it. I thought about the 22 arguments that were made and made sure that they 23 were clear in my mind again. 24 I reviewed the patents that are at issue. I 25 think that pretty much covers it.</p>
<p style="text-align: right;">Page 79</p> <p>1 notifies the token holder that it is prepared to 2 become the new successor of the token holder. 3 Q. In order to receive the "solicit 4 successor" frame, is it required that a station 5 wanting to become a ring member is already 6 connected to the physical bus? 7 A. Well, so as we discussed before, what 8 Rufino fundamentally requires is some kind of 9 underlying broadcast channel. And a physical bus 10 certainly serves as an underlying broadcast 11 channel. 12 The node that wishes to join needs to be 13 connected to that underlying broadcast channel in 14 order to receive the "solicit successor" message. 15 But, again, a person of ordinary skill would 16 understand that this broadcast channel could be 17 implemented in a variety of ways, either as a 18 physical bus or as a -- some sort of logical 19 broadcast channel. 20 Q. So it's not required for a station that 21 wants to join to identify a channel type or 22 instance that identifies the physical bus or the 23 logical ring? 24 MR. MURRAY: I'll object to the form. 25 A. Well, if there is only one logical</p>	<p style="text-align: right;">Page 81</p> <p>1 Q. Which attorneys did you meet with in 2 preparation for your deposition today? 3 A. Well, I met with several of the 4 attorneys who have been present at the 5 depositions, David Lin, Mike. Is there anybody 6 else? Not that I recall for preparing for this 7 deposition. 8 Q. Is there any reason, physical, mental 9 or emotional, that prevented you from giving your 10 best and most accurate testimony today? 11 A. No. 12 Q. Are you on any type of medication or 13 drugs that made it difficult for you to 14 understand and truthfully answer my questions? 15 A. I'm not. 16 Q. Are there any answers to my questions 17 that you wish to change before we close? 18 A. No. 19 Q. Is there any information that I asked 20 you about that you can remember now that you 21 didn't recall when I asked the question before? 22 A. No. 23 Q. Is there anything else you'd like to 24 add to what you've told us today? 25 A. No. I don't think so.</p>

<p>1 MR. PRICE: We're done. 2 MR. MURRAY: Okay. I have no 3 questions. 4 THE VIDEOGRAPHER: The time now is 5 1:47 p.m. This brings us to the end of Disk 3 of 6 today's deposition and closes out the deposition 7 with Dr. David Karger. We're off the record. 8 (Deposition concluded at 1:47 p.m.) 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25</p>	<p>Page 82</p>
<p>1 C E R T I F I C A T E 2 COMMONWEALTH OF MASSACHUSETTS 3 SUFFOLK, SS. 4 I, Janet M. Sambataro, a Registered 5 Merit Reporter and a Notary Public within and for 6 the Commonwealth of Massachusetts do hereby 7 certify: 8 THAT DAVID KARGER, Ph.D., the witness 9 whose testimony is hereinbefore set forth, was 10 duly sworn by me and that such testimony is a 11 true and accurate record of my stenotype notes 12 taken in the foregoing matter, to the best of my 13 knowledge, skill and ability; that review was not 14 requested. 15 I further certify that I am not related 16 to any parties to this action by blood or 17 marriage; and that I am in no way interested in 18 the outcome of this matter. 19 IN WITNESS WHEREOF, I have hereunto set 20 my hand this 30th day of November, 2016. 21  22 23 JANET M. SAMBATARO Notary Public 24 My Commission Expires: 25 July 16, 2021</p>	<p>Page 83</p>

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