IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

WORLDS INC., Plaintiff, v. LINDEN RESEARCH, INC., d/b/a LINDEN LAB; Defendant.	Civil Action No. _____ **DEMAND FOR JURY TRIAL**

PLAINTIFF WORLDS INC.'S ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT AGAINST LINDEN RESEARCH, INC., d/b/a LINDEN LAB

Plaintiff Worlds Inc. ("Worlds"), by and through its attorneys, hereby alleges this Complaint against Defendant Linden Research, Inc., d/b/a Linden Lab ("Linden" or "Defendant") for patent infringement.

PARTIES

1. Plaintiff Worlds is a corporation organized and existing under the laws of the State of Delaware and having a principal place of business at 11 Royal Road, Brookline, Massachusetts.

2. Upon information and belief, Defendant Linden Research, Inc., d/b/a Linden Lab is a Delaware corporation with a place of business at 945 Battery Street, San Francisco, California 94111, and can be served through its registered agent, the Corporation Trust Company, Corporation Trust Center, 1209 Orange Street, Wilmington, Delaware 19801.

3. Worlds is the sole and exclusive owner of U.S. Patent No. 7,181,690, titled "System and Method for Enabling Users to Interact in a Virtual Space" (the "'690 Patent"). A true and correct copy of the '690 Patent is attached as Exhibit A.

4. The '690 Patent generally discloses and claims, *inter alia*, a method used for improving network communications and managing client processing burdens in a multi-client/server architecture used in three-dimensional, computer-generated, graphical, multi-user,

interactive virtual world systems. More specifically, the '690 Patent is directed to a method used in systems that permits a plurality of users to interact in a three-dimensional, computer-generated, graphical virtual world, where each user executes a "client process" to view the virtual world from the perspective of that user. The client process displays the virtual world to the user, and that view may include avatars representing other users who are neighbors of the user in the virtual world. So that the virtual world can be updated to reflect the motion or rotation of users' avatars, avatar position information is transmitted from each user's client process to a centralized "server process," which transmits certain position updates to the client processes. The '690 Patent also discloses and claims improved methods for determining which neighboring avatars are to be displayed by a user's client process.

5. Defendant Linden Lab made, used, sold, offered for sale, and/or imported in the United States, including in this judicial district, products that directly infringe at least method claims 4 and 8 of the '690 Patent, either literally or under the doctrine of equivalents. These products include but may not be limited to its Second Life products and associated hardware and software, including Second Life server(s) and the Second Life Viewer (collectively, the "Accused Products").

JURISDICTION AND VENUE

6. This is an action for patent infringement, arising under the patent laws of the United States, 35 U.S.C. §§ 1, *et seq.*

7. This Court has subject matter jurisdiction over this action under 28 U.S.C. §§ 1331 and 1338(a).

8. Defendant Linden Lab is a company organized under the laws of the State of Delaware and is subject to this Court's specific and general personal jurisdiction.

9. Defendant Linden Lab has committed acts of infringement within the state of Delaware, as alleged herein, and has derived substantial revenues from its infringing acts occurring within Delaware.

10. Defendant Linden Lab uses and offers to its customers, within the state and District of Delaware, the "Second Life" virtual world and its immersive virtual reality environment, where participants and live performers can interact with each other and the environment. The "Second Life" virtual world includes the presence of the University of Delaware, which has rented a virtual island in Linden Lab's "Second Life" virtual world to support the University of Delaware's virtual academic use. "Second Life" customers accessing the University of Delaware's "Second Life" island, including University of Delaware faculty, students, and staff, are subject to the applicable University of Delaware policies, including the Student Code of Conduct, the Policy for Responsible Computing, and the policies governing appropriate conduct.

11. Defendant Linden Lab also uses and offers to its customers, within the state and District of Delaware, the "Second Life Viewer" as a necessary tool for its customers to access the "Second Life" virtual world and its immersive virtual reality environment.

12. In addition to its office in the state of California, Defendant Linden has a number of offices across the United States, including in (1) Boston, Massachusetts, (2) Charlottesville, Virginia, (3) Charlotte, North Carolina and (4) Atlanta, Georgia.

13. For these reasons, personal jurisdiction exists and venue is proper in this District and Court under 28 U.S.C. § 1400(b).

BACKGROUND – WORLDS, INC.

14. Worlds, Inc., a publicly traded company having stock ticker symbol "WDDD," is one of the earliest developers and an original innovator in the field of internet-based, multiplayer, 3-D entertainment. *See* Exhibit B, Gina Smith, *"Whole new Worlds on-line: S.F. Startup Making Waves with 3-D Virtual Reality World on the Internet"*, San Francisco Examiner, May 14, 1995; Exhibit C, Todd Copilevitz, *"Here's a chat room worth talking about"*, Dallas Morning News, June 11, 1995. As early as 1994, the company was engaged in the research and development of 3-D online worlds, the kind of technology that now powers massively multiplayer online role playing games ("MMORPGs").

15. Worlds, Inc. was a spin-off of closely held Knowledge Adventure, Inc. Worlds Inc. was formerly known as Knowledge Adventure Worlds. *See* Exhibit D, *Worlds Inc. Announces "Worlds Chat"*, Business Wire, April 25, 1995; Exhibit E, Jared Sandberg, *"Talking Blowfish to Enliven the Internet"*, The Wall Street Journal, April 3, 1995.

16. Worlds, Inc. was at times known as Worlds.com, Inc.

17. With ground-breaking product offerings in 1995, Worlds was one of the earliest adopters and developers of key technologies used in today's virtual reality and immersive environments.

18. While the video gaming industry was in its infancy in 1994-1995, it is now a $100 billion a year industry and includes companies having multi-billion-dollar annual revenues. *See* Exhibit F, Teodora Dobrilova, "How Much Is the Gaming Industry Worth," techjury, April 4, 2019 (available at https://techjury.net/stats-about/gaming-industry-worth/).

BACKGROUND – WORLDS' INNOVATION

19. In 1995, four Worlds employees — Dave Leahy, Judith Challinger, B. Thomas Adler, and S.J. Ardon (together, the "named inventors") — were faced with problems in the field of computer networks and discovered novel solutions that are the inventions disclosed in the '690 Patent asserted in this lawsuit. The named inventors arrived at their inventions while developing Worlds' virtual-worlds software platforms, *Worlds Chat* and *AlphaWorld* — both of which were first introduced in 1995, and enabled remote users to chat and interact over the Internet in graphically rich, three-dimensional virtual environments.

20. Worlds unveiled its 3-D virtual space referred to as *Worlds Chat* in 1995 and distributed it to the public for free. *Worlds Chat* was a virtual worlds software application that allowed remote users to chat over the internet while occupying a visually rich three-dimensional virtual world. *See* Exs. B, C, D, E.

21. Worlds Chat users are represented by three-dimensional avatars. Users can view the virtual world from the point of view of their avatar and freely move through the virtual world. *See* Ex. D.

22. Worlds' technology was a radical leap from menu-driven, icon-based interfaces. Worlds' ground-breaking technology connected three-dimensional interactive environments even over regular phone lines in 1995, with minimum hardware requirements of a 9600 baud modem and a 486 PC. *Id*.

23. On May 14, 1995, the *San Francisco Examiner* published an article entitled "S.F. Startup Making Waves with 3-D Virtual Reality World on the Internet." Ex. B. In the article Gina Smith reported, "Worlds—a spin off of La Crescenta-based edutainment firm Knowledge Adventure—has created Worlds Chat. It is one of the first examples of virtual reality on the Internet I've seen." The article further states, "Worlds Chat is a virtually real, multi-user 3-D world that you can walk through and meet people in" and "Worlds Chat is different. This isn't just text, it's a graphical environment." *Id*.

24. Worlds' work on virtual environments also drew the attention of Steven Spielberg. In its article, the San Francisco Examiner reported that, "Last week, movie director Steven Spielberg announced that his nonprofit Starbright Foundation is working with Worlds, Intel, UB Networks and Sprint to create a 3-D environment where hospitalized children can play and socialize with each other." *Id*.

25. Other newspaper articles written that year touted the achievements of Worlds Chat. For example, on June 11, 1995, the *Dallas Morning News* published an article titled "Here's a chat room worth talking about." Ex. C. The reporter Todd Copilevitz stated, "Worlds Chat is the hottest innovation the Internet will see this year. Write it down, take it to the bank. It may well be the most important, too, not just for the innovation it marks but the potential it brings to cyberspace." *Id*. The article further states, "Worlds Chat is a new service from Worlds Inc. of San Francisco. It uses direct Internet connections, the type offered by local service providers and CompuServe, to gather users from around the world." *Id*.

26. Coming out of Worlds' innovation associated with Worlds Chat was the technology that provides the backbone for the patent at issue here. Shortly after the release of Worlds Chat, the named inventors initially set forth their inventions in a provisional patent

application filed on November 13, 1995 (the "Provisional Application"). Exhibit G, U.S. Provisional Patent Application No. 60/020,296.

BACKGROUND - WORLDS' PATENT PORTFOLIO

27. Worlds has been granted multiple U.S. patents, issuing from April 2001 to August 2015, for various inventions including certain client-server load balancing technology for three-dimensional virtual worlds. These inventions allow multiple users to interact in the three-dimensional, computer-generated graphical space, where each user executes a client process to view the virtual world from the perspective of that user. To update the virtual world to reflect the motion and/or rotation of the users' avatars, position information is transmitted to a central server, which then provides position updates to client processes for displaying the updated virtual world from the point of view of their respective users. The client processes also use an environment database to determine which background objects to render, as well as to limit the movement of an associated user's avatar.

28. Worlds' U.S. patent application No. 08/747,420 was filed on Nov. 12, 1996, claimed priority from the Provisional Application, and issued as U.S. Patent No. 6,219,045 (the "'045 Patent") on April 17, 2001. The '690 Patent, the Patent-in-suit, is a continuation of the '045 Patent. *See* Ex. A.

29. Worlds Inc., at times operating under the name Worlds.com Inc., is the original and sole assignee of the '690 Patent. *Id*.

30. To date, Worlds' patent infringement enforcement program has pursued claims against multi-billion-dollar video game developing companies.

BACKGROUND - PRIOR LITIGATION AND ADMINISTRATIVE PROCEEDINGS

31. In 2008, Worlds filed a patent infringement lawsuit against NCSoft Corporation. *See Worlds.Com Inc. v. NCSoft Corp.*, Civil Action No. 6:08-cv-00508 (E.D. Tex., December 24, 2008); *Worlds.Com Inc. v. NCSoft Corp.*, Civil Action No. 3:09-cv-01982 (N.D. Cal., May 8, 2009). The asserted patents in the lawsuit against NCSoft Corp. included the '690 Patent. This lawsuit settled without proceeding to trial.

32. On March 30, 2012, Worlds filed a patent infringement lawsuit against Activision Blizzard, Inc., Blizzard Entertainment, Inc., and Activision Publishing, Inc., (collectively, "Activision") in the United States District Court for the District of Massachusetts for patent infringement. *Worlds, Inc. v. Activision Blizzard, Inc., et al.*, Civil Action No. 1:12-CV-10576 (D. Mass., March 30, 2012). The asserted patents in the lawsuit against Activision included the '690 Patent.

33. On June 26, 2015, a claim construction order was issued in Worlds' litigation with Activision. Exhibit H, *Worlds, Inc. v. Activision Blizzard, Inc., et al.*, Dkt. No. 153.

34. On September 4, 2015, Activision filed a Motion for Summary Judgment against Worlds, asserting that the Asserted Patent Claims are Invalid under 35 U.S.C. § 101. *Worlds, Inc. v. Activision Blizzard, Inc., et al.*, Dkt. Nos. 174-177.

35. In late May and early June 2015, Bungie, Inc. (a company having a contractual relationship with Activision) filed a number of petitions for *inter partes* review ("IPR") with the Patent Trial and Appeal Board ("PTAB") of the U.S. Patent and Trademark Office ("USPTO"), challenging the validity of many of the claims in the Worlds patent portfolio, including claims of the '690 Patent. The PTAB instituted the IPRs and reached final decisions on each. Three IPRs directed to patents other than the '690 Patent were appealed by Worlds and have been remanded to the PTAB by the Federal Circuit. *See Worlds Inc. v. Bungie, Inc.,* 903 F.3d 1237 (Fed. Cir. 2018).

36. The Massachusetts District Court litigation was stayed in 2015, and remains stayed pending the outcome of the three remanded IPRs. Because of the stay, the District of Massachusetts has not ruled on the § 101 Motion for Summary Judgment filed by Activision.

37. In the IPR directed to the '690 Patent, the PTAB instituted review and issued its Final Written Decision on November 30, 2016. In that Final Written Decision, claims 4, 8, 13 and 16 of the '690 Patent were upheld as patentable over Bungie's challenges by the PTAB. *See* Ex. A.

OVERVIEW OF U.S. PATENT NO. 7,181,690

38. The ’690 Patent was filed as U.S. Patent Application No. 09/632,154 on August 3, 2000, and claims priority to and the benefit of U.S. Patent Application No. 08/747,420, filed on November 12, 1996, now the ’045 Patent. *Id*.

39. The ’690 Patent also claims priority to and benefit of the Provisional Application. *See Id.*, Certificate of Correction.

40. The ’690 Patent is titled: “System and Method for Enabling Users to Interact in a Virtual Space.” *Id*. As described in the Background of the ’690 Patent, there are difficulties in a conventional “client-server system” for 3-D virtual reality “game playing, where the positions and actions of ***each user*** need to be communicated between ***all the players*** to inform ***each*** client of the state changes (position, actions, etc.) which occurred at the other clients.” *Id*. at 1:49-53 (emphasis added).

41. Similar to the traditional client-server system, the prior “peer-to-peer architecture” required many messages to provide the state change updates, and because of the heavy processing loads and limited capabilities of a workstation in a 3-D environment, this requirement to process many messages “limits the number of clients which can be connected to the network.” *Id*. at 1:56-61.

42. The ’690 Patent describes an improved system in which “the virtual world server must be much more discriminating as to what data is provided to each client[].” *Id*. at 3:42-44.

43. In an embodiment, N represents a server variable setting the “maximum number of other avatars A will see.” *Id*. at 5:36-40. The server can implement a server-side crowd control function by providing positions to a client process for only N avatars.

44. Additionally, to handle the remote avatar positions received by a client, the client includes “a way to filter out avatars” for display using, according to various embodiments, proximity, user ID, or a crowd control function (which is “needed in some cases to ensure that neither client 60 nor user A get overwhelmed by the crowds of avatars likely to occur in a popular virtual world.”). *Id*. at 5:65-67; 5:31-35. In an embodiment, N’ represents a client

variable setting the "maximum number of avatars client 60 wants to see and/or hear." *Id*. at 5:36-40. The N and N' values may be identical or may be different.

45. In implementation, the server 61 can include a "user object 64," which "maintains a list of the N nearest neighboring remote avatars … in the room." *Id*. at 14:41-43. The '690 Patent describes the "process of notifying client 60 of only the N nearest neighbors … as part of crowd control" on the server side. *Id*. at 14:48-49. Where N' is less than N, the client may use "position data to select N' avatars from the N avatars provided by the server" for display of the N' avatars. *Id*. at 6:6-8.

46. Thus, the '690 Patent discloses server-side crowd control, such that the server may notify the client of the positions of only certain relevant neighboring avatars. The client determines the avatars to be displayed based on, for example, the received positions from the server, and a comparison of the N and N' values. This rendering engine 120 then generates the graphical display from the point of view (position and orientation) of the client's avatar. *Id*. at 7:52-54.

47. On October 19, 2006, the USPTO Examiner examining the application that led to the '690 Patent issued a NOTICE OF ALLOWANCE AND FEE(S) DUE, allowing the claims in Patent Application No. 09/632,154. In the section titled "Allowable Subject Matter," the Examiner issued a statement of reasons for allowance. The Examiner concluded:

> The following is a statement of reasons for the indication of allowable subject matter: Applicant has claimed uniquely distinct features in the instant invention which are not found in the prior art either singularly or in combination of a method (a) receiving a position of at less [*sic*] than all of the other users' avatar[s] from the server process; and (b) determining, from the received positions, a set of the other users' avatars that are to be displayed to the first user, wherein the steps (a) and (b) are performed by the client process associated with the first user. The closest prior art Suzuki discloses a conventional terminals each receive of all of the position information of other user's avatar from the server; either singularly or in combination fail to anticipate or render the above underline limitations obvious.

See Exhibit I, NOTICE OF ALLOWANCE AND FEE(S) DUE dated October 19, 2006.

ASSERTED CLAIMS OF THE '690 PATENT

48. The asserted claims of the '690 Patent include claims 4 and 8, presented below.

49. Asserted Claim 4 depends from independent claim 1. Taken together, the claim recites:

1. A method for enabling a first user to interact with other users in a virtual space, wherein the first user and the other users each have an avatar and a client process associated therewith, and wherein each client process is in communication with a server process, wherein the method comprises:

(a) receiving a position of less than all of the other users' avatars from the server process; and

(b) determining, from the received positions, a set of the other users' avatars that are to be displayed to the first user,

wherein steps (a) and (b) are performed by the client process associated with the first user.

4. The method of claim 1, wherein step (1b) comprises

(b)(1) determining from the received positions an actual number of the other users' avatars;

(b)(2) determining a maximum number of the other users' avatars to be displayed; and

(b)(3) comparing the actual number to the maximum number to determine which of the other users' avatars are to be displayed wherein steps (b)(1)-(b)(3) are performed by the client process associated with the first user.

50. Asserted Claim 8 depends from independent claim 6. Taken together, the claim recites:

6. A method for enabling a plurality of users to interact in a virtual space, wherein each user has a computer associated therewith, wherein each computer has a client

process associated therewith, wherein each client process has an avatar associated therewith, and wherein each client process is in communication with a server process, comprising:

(a) monitoring, by each client process, a position of the avatar associated with the client process;

(b) transmitting, by each client process to the server process, the position of the avatar associated with the client process;

(c) transmitting, by the server process to each client process, the positions of less than all of the avatars that are not associated with the client process; and

(d) determining from the positions transmitted in step (c), by each client process, a set of the avatars that are to be displayed.

8. The method of claim 6, wherein step (d) comprises

(d)(1) determining an actual number of avatars that are not associated with the client process based on the positions transmitted by the server process;

(d)(2) determining a maximum number of avatars that can be displayed; and

(d)(3) comparing the actual number to the maximum number to determine which of the avatars are to be displayed.

THE TECHNICAL PROBLEM SOLVED BY THE '690 PATENT

51. The '690 Patent addresses a computer-centric problem unique to networked multiuser client-server systems: how to facilitate interaction among a large (and potentially unknown or variable) number of remote users in a three-dimensional world, given the limitations in network capacity and the different capabilities of client computers connected to the virtual world. Ex. A at 1:10–2:20.

52. The '690 Patent specification further discusses the problems in this technology space. In "game playing, [ ] the positions and actions of each user need to be communicated

between all the players to inform each client of the state changes (position, actions, etc.) which occurred at the other clients." *Id*. at 1:49–53. But "where many client machines or processes are communicating with each other in real-time through the server, several problems arise." *Id.* at 1:37–40. "For example, where a client-server system is used for real-time exchange of information, such as a … virtual reality network where users … visually and aurally interact with other users … communication is much more difficult, especially where the information is high-bandwidth data such as audio streams, graphic streams, and image streams." *Id*. at 1:42–48. That problem—the "difficulty" of using a "client-server system" for "real-time exchange of information … where the information is high-bandwidth data"—exists *only* in networked multiuser systems.

53. There is no real-world analogue of the problem Worlds' inventors faced, *i.e*., the risk that due to a large number of remote users, a system could crash or performance could become intolerably sluggish.

54. Worlds was not the first to allow extensive remote user interaction. An earlier approach involved "peer-to-peer" architecture, where each user communicated directly with all other users. *Id*. at 1:56–59. But peer-to-peer communication imposed heavy processing loads and "limit[ed] the number of clients which can be connected to the network." *Id.* at 1:56–61. Another approach used a server to "broadcast" information to all users, but as transmissions swelled in size due to increased numbers of users, a broadcast approach was neither "efficient" nor "reliable" and, in an "open network[ ] such as the Internet … [was] not even possible." *Id*. at 2:4–16.

55. As an improvement, the '690 Patent teaches an invention where a server and a client both perform culling functions—filtering avatars using criteria—to control crowds, manage network loads, and facilitate interaction of remote users in a three-dimensional world.

56. Instead of a typical client-server architecture, where all avatar position and state information would be broadcast to all users, here the asserted claims teach a method of managing

network loads while controlling crowds at both the server and the client process, thereby improving the user experience.

57. The asserted claims of the ’690 Patent describe a virtual world server that operates differently than other general-purpose computer servers. “So that the virtual world is scalable to a large number of clients, the virtual world server must be much more discriminating as to what data is provided to each client[].” *Id*. at 3:41-44. The ’690 Patent’s virtual world server sends position information only for certain user avatars.

58. To efficiently process received position information for other avatars, a client determines which of those other avatars to display (which is “needed in some cases to ensure that neither client [ ] nor user [ ] get overwhelmed by the crowds of avatars likely to occur in a popular virtual world.”). *Id.* at 5:65–67, 5:31-35.

59. Thus, the ’690 Patent claims are directed to solving a problem of facilitating interaction among remote users in a three-dimensional virtual world by performing crowd control, both at the server side and at the client side. Iterations of this innovation are claimed in the asserted claims 4 and 8 of the ’690 Patent.

60. These asserted claims provided a solution to the defined computer-centric problem by teaching a method for implementing a scalable client-server architecture that facilitates the efficient interaction of remote users in a 3-D, multi-user, interactive virtual environment. *Id.* at 1:24–42. The disclosed client-server system is relevant to multiplayer three-dimensional video games and internet chat programs, where the positions and actions of each avatar are communicated to other users.

61. In line with the claims, the notable features of the ’690 Patent invention are (1) a first user in a virtual world (represented by a three-dimensional avatar), (2) with an associated client process, that (3) monitors and sends position information to a server. In turn, the server (4) receives position information from the first user’s and other users’ avatars, and (5) sends to each client process the position and state information for less than all of the other users’ avatars.

Then, based on the received position and state information from the server, the client (6) determines a set of other avatars to be displayed.

62. Thus, the '690 Patent discloses and claims a specific solution to a computer-centric problem unique to multiuser interaction over the internet.

63. As noted in the '690 Patent, "Crowd control is one of the tougher problems solved by the present system." *Id*. at 13:23-24.

64. The claim construction order issued in the District of Massachusetts recognized that the '690 Patent and its claims "disclose an invention to solve the problem of 'crowd control,'" which is a computer-centric problem unique to computer networks with multiuser client-server systems. Ex. H at 8.

65. That order also described the Worlds patents as "*directed to* a client-server network that enables large numbers of computer users to interact in a 'virtual world' displayed on a computer screen." Ex. H, 1 (emphasis added); *see also, e.g.*, *id.* at 8 ("[T]he specification discloses an invention to solve the problem of 'crowd control.'"); *id.* at 20–24 (construing the term "avatar" as "a graphical representation of the user in three-dimensional form," and noting that "the specification consistently refers to a three-dimensional virtual world[.]").

THE '690 PATENT CLAIMS PATENT ELIGIBLE SUBJECT MATTER

66. For a number of reasons, some of which are described in this Complaint, the asserted claims of the '690 Patent claim patent eligible subject matter. The '690 Patent claims new, novel and useful improvements over existing means or methods. The '690 Patent solves at least two technical problems: large numbers of messages being transmitted between a server and each user/client in a networked virtual environment, and the overwhelming processing load on a client resulting from large numbers of avatars existing in the virtual environment.

67. The '690 Patent specification sets forth computer functionality problems with conventional peer-to-peer systems handling the amount of data messages being passed from user/client to user/client. There were limitations in the typical "peer-to-peer architecture" in managing the data flow of messages passing between clients, especially "where the network is

not a dedicated network, but is an open network, such as the Internet." *Id*. at 1:56-2:16. The '690 Patent specification teaches that the claimed invention achieves benefits over such conventional peer-to-peer systems.

68. The '690 Patent's asserted claims recite patent eligible subject matter because they entail an unconventional technological solution (e.g., server-side and client-side crowd control by limiting the number of position messages transmitted from the server side, and by limiting other user/client avatars visible to, and interacting with, each user/client) to technological problems (e.g., a large number of messages being sent and received by each user/client in a game network environment, and a client that is overwhelmed by position information for an excessive number of other avatars existing in the virtual world).

69. The '690 Patent specification describes computer functionality problems arising "where many client machines or processes are communicating with each other in realtime through the server…" *Id*. at 1:38-41. "For example, where a client-server system is used for real-time exchange of information, such as a distributed virtual reality network where users at client machines visually and aurally interact with other users at other client machines, communication is much more difficult, especially where the information is high-bandwidth data such as audio streams, graphic images and image streams. One application of such a client-server system is for game playing, where the positions and actions of each user need to be communicated between all the players to inform each client of the state changes (position, actions, etc.) which occurred at the other clients. The server might maintain global state information and serve as a data server for the clients as they request visual, program and other data as the game progresses." *Id*. at 1:42-55.

70. The '690 Patent solves the described computer functionality problem by providing "an efficient system for communication between many client systems over dedicated or open networks to provide graphical interaction between users operating the client systems." *Id*. at 2:17-20. "So that the virtual world is scalable to a large number of clients, the virtual

world server must be much more discriminating as to what data is provided to each client[].” *Id*. at 3:41-44.

71. The ’690 Patent also creates a server-based and client-based scalable solution for the massive multiplayer virtual world. This scalable solution did not exist in 1995.

72. Worlds’ ’690 Patent solves the computer-centric “crowd control” problem with technological solutions. In an embodiment, the technical solution includes having each remote avatar user/client maintaining a “position table” showing all other avatars that are “in range” and a server, with a variable N, which sets a maximum number of other avatars a user/client will see depending on which are closest to the user’s avatar. *Id*. at 5:29-47. In an embodiment, the server maintains “for each user, a list of the N avatars nearest to the location of that user's avatar” and transmits positional information for only those N avatars to a user’s client process. *Id*. at 13:30-40. This solution allows for improved game play with reduced data flow across the network.

73. The ’690 Patent is directed to an improvement to the way computers operate and claims the improvement. In implementation, the ’690 Patent solution improves computer functionality by way of increasing the gaming speed and reducing the network message data flow.

74. The ’690 Patent entails an unconventional technological solution to a technological problem and achieves a practical result. The ’690 Patent teaches crowd control by having a server limit the number of other user/client avatar position information to the client, and the client determining a maximum number of potentially visible avatars to be displayed.

75. The claims of the ’690 Patent include enhancing limitations that necessarily require that even any generic components operate in an unconventional manner to achieve an improvement in computer functionality.

76. The ’690 Patent claims describe and claim an “inventive concept.” In an embodiment, the ’690 Patent describes a server process, remote from the client end-users, for filtering or limiting of the number of avatar position information to be transmitted to the client.

77. The ’690 Patent claims describe and claim an “inventive concept,” whereby a limited amount of avatar position information is transmitted from a customizable “server process,” remote from the end user/client, to the client.

78. The claims of the ’690 Patent are not directed to a judicial exception to patentability nor to an abstract idea. The ’690 Patent claims are not directed to mathematical concepts, but instead are directed to managing the avatars shown on a screen and to limiting network traffic between a server and clients. The ’690 Patent claims are not directed to organizing human activity, but instead, for example, to computers for accessing and interacting with a virtual world. The ’690 Patent is also not directed to mental processes or concepts performed in the human mind. Instead, the invention is implemented on computer systems implementing a computer-based virtual world, and does not involve human intervention.

79. The claims of the ’690 Patent are directed to a practical application of determining which avatars to display in a virtual environment existing solely on computers. More particularly some claims are directed to a client process determining which avatars to display based a comparison of an actual number of avatar positions received from a server, and a maximum number of avatars to be displayed.

80. The claimed invention of the ’690 Patent is rooted in computer technology. Virtual worlds for avatars only exist in the realm of computers. Only computers can decide, from among the numerous avatar positions received from a server, which avatars to display in a virtual world.

81. The claimed invention of the ’690 Patent is an improvement to virtual world computer systems. The ’690 Patent improves the efficiency of processing the positional updates of avatars in the virtual world. This improved efficiency and speed is achieved through a server-side and client-side process that reduces message traffic and decreases processing resources for display of other avatars.

82. The ’690 Patent claims a solution that is necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer

networks by providing an "inventive concept," comprised of limiting the number of avatars visible and interacting in a virtual space via a server-side filtering, client-side filtering, and a combination thereof.

83. The '690 Patent provides a practical solution to a problem and generates a practical result. The '690 Patent claims use computers to reduce message traffic and network load in a crowded virtual space, and to transform a crowded virtual space into a generated display with less than all the avatars. This practical solution and practical result has a negligible impact on virtual world interaction between a client's avatar and other users' avatars.

84. The '690 Patent system and methods are not merely well-understood, routine, conventional activities previously known to the industry. Meetings of avatars in the virtual world were still new in 1995. *See* Exhibit J, *"Now, A 'Space Station' In Your Pc"*, BloombergBusiness, April 10, 1995; *see also* Exs. B, C, D, E.

85. In 1995, meetings of large groups of avatars in a virtual world were uncommon and subject to technological constraints. On April 3, 1995 Wall Street Journal staff reporter Jared Sandberg wrote "Virtual worlds, as on-line computer buffs call them, may be the next part of the Internet to get mighty crowded." *See* Ex. E. In 1995, Worlds Inc. rolled out an on-line virtual "environment" hoping hordes of Internet users would want to chat and explore a virtual world existing in simulated three dimensions. *Id.* "All of these things, [such as chatting in the virtual world,] presage the new telecommunications medium that is going to replace the telephone touch-tone keypad." *Id*. Such chatting in the virtual world, was identified as a possible "backdrop" for on-line business meetings. *Id.* The value of virtual meetings with a large numbers of individuals was not understood, large virtual world meetings were not yet occurring, and therefore the problem was not understood and solutions were not available. *Id.*

86. Meetings of three-dimensional avatars in a virtual world were not only not routine in 1995, they were virtually non-existent until release of Worlds' product in April of 1995. *See* Exs. D, E. Thus, a large gathering of avatars was not routine, and systems implementing virtual world had not arranged for any solution to address the technological constraints imposed by

either the increased network message traffic resulting from large numbers of avatars or the impact of a large number of avatars on a client process generating a display of the crowded virtual world.

87. In 1995, there were no conventional systems or methods for implementing both server-side and client-side crowd control in virtual worlds with large numbers of avatars.

88. The methods described and claimed in the '690 Patent were neither routine nor conventional. They broke from the peer-to-peer systems and client-server architecture of the prior art by using an unconventional server implementing an unconventional message flow, and an unconventional client using the position information from the server to further manage a crowded virtual world.

89. In the Examiner's reasons for allowance, also cited above, the claims were described as not well-understood, routine nor conventional: "Applicant has claimed uniquely distinct features in the instant invention which are not found in the prior art ***either singularly or in combination***." *See* Ex. I at 8 (emphasis added).

90. In addition to the individual claim elements of the '690 Patent having an "inventive concept," the '690 Patent claim elements, considered as an ordered combination, disclose an inventive concept and thus cover patent eligible subject matter. Each '690 Patent claim taken as a whole teaches a multistep process whereby, in a virtual space, a server has received position information of avatars associated with network clients; the server sends position information for fewer than all avatars to a client; and the client can, in turn, further determine which avatars to display from among the position information sent by the server. That combination was inventive and not overbroad.

91. The claims of the '690 Patent do not broadly and generically claim use of the Internet to perform an abstract business practice; instead, they specify how interactions with the Internet are manipulated to yield a desired result—a result that overrides the routine and conventional sequence of events ordinarily triggered in conventional networked multiuser client-server systems.

92. The ’690 Patent claims unique and non-conventional methods for processing the display of avatars in a computer environment. The claimed method of reducing computer system communication traffic related to avatars in a virtual space (by sending positions of less than all the avatars) and determining the number of avatars to be displayed was counter-intuitive at the time of the invention. Specifically, the virtual world concept was designed to bring remotely located users together in a common virtual environment. In order to achieve its solution, the ’690 Patent took the counter-intuitive approach of reducing the message traffic conveying updated position information from the server to the client by sending position information for fewer than all other user avatars, and also accounting for a maximum number of other users’ avatars to display by a client when that client determines which other users’ avatars to display. The ’690 Patent achieves this result with a non-conventional server and non-conventional client system.

93. Worlds’ ’690 Patent claims a limited number of specific solutions for facilitating remote user interaction in a virtual space. Worlds’ ’690 Patent is not unduly pre-emptive, as it leaves open other potential approaches to manage network loads in the context of remote user interaction in a virtual space.

94. Worlds’ ’690 Patent is directed to a specific improvement to multiuser 3-D software implementations and extends no further. Worlds’ innovations can be used, for example, in multiplayer video games, internet chat rooms, or 3-D business-to-business software applications, but do not preempt other solutions.

COUNT I – DIRECT INFRINGEMENT OF U.S. PATENT NO. 7,181,690

95. Worlds incorporates herein by reference the allegations stated in paragraphs 1- 94 of this Complaint.

96. On February 20, 2007, the United States Patent and Trademark Office duly and legally issued the ’690 Patent to the inventors Dave Leahy, Judith Challinger, B. Thomas Adler, and S.J. Ardon. Worlds is the owner by assignment of all right, title and interest in and to the ’690 Patent, including the right to sue, enforce and recover damages for all past, present, and

future infringements of the patent.

97. At least claims 4 and 8 of the ’690 Patent are directed to providing a unique computing solution that addresses a problem particular to computerized virtual reality systems, in which avatars respectively representing a plurality of users can interact in a virtual world, or three-dimensional, computer generated graphical space managed by a server process.

98. Defendant Linden Lab has directly infringed, either literally or through the doctrine of equivalents, one or more claims of the ‘690 Patent, by making, using, offering to sell, selling and/or importing products in the United States and in this judicial district, including but not limited to the Second Life Accused Products, that practice the methods claimed in at least claims 4 and 8 of the ’690 Patent, thereby constituting infringement under 35 U.S.C. § 271(a).

99. The Accused Products infringe at least claim 4 of the ’690 Patent because each of the Accused Products performs a method on a client process, such as the Second Life Viewer, for enabling a first user to interact with other users in the virtual space known as Second Life, wherein the first user and the other users each have an avatar, and each have a client process associated with each of those avatars, and where each of the client processes is in communication with a server process, namely programmed software on Second Life server(s). Exhibit K, Infringement Claim Chart for Claims 4 and 8 of U.S. Patent No. 7,181,690, at 1-2.

100. In use, each of the Accused Products includes software programming, such as the Second Life Viewer, for the first user’s client process to perform a series of steps including: the Second Life Viewer receiving the positions of less than all of the other users’ avatars from the server process, namely programmed software on Second Life server(s) that transmits position information of avatars in a region to other users’ client processes that can view that region; and determining from the received positions a set of those other users’ avatars to be displayed to the first user by the Second Life Viewer. *Id*. at 2-7.

101. This determining step includes the Second Life Viewer determining from the received positions an actual number of the other users’ avatars, determining the maximum number of those other users’ avatars to be displayed, and comparing the actual number to the

maximum number to determine which of the other users' avatars are to be displayed. *Id*. at 9-19. From the received position information transmitted by the Second Life server(s), the Second Life Viewer ranks the other users' avatars by position, and compares each avatar's visibility rank (mVisibilityRank) to a variable, sMaxVisible to determine which of the other users' avatars are to be displayed. *Id*. The variable xMaxVisible is affected by control "RenderAvatarMaxVisible," which identifies the "Maximum number of avatars to display at any one time." *Id*.

102. Upon information and belief, Defendant Linden Lab also tested and used its Accused Products in systems and in the manner as described in paragraphs 99-101.

103. Each of the Accused Products infringes at least claim 8 of the '690 Patent because each of the Accused Products performs a method for enabling a plurality of users to interact in a virtual space known as Second Life, wherein each user has an associated computer that runs a client process, such as a Second Life Viewer, and an associated avatar, and each user's computer/client process is in communication with a server process, namely programmed software on Second Life server(s). *Id*. at 21-23.

104. In use, each of the Accused Products performs the steps including: monitoring the position of each user's avatar through their associated client processes, namely the Second Life Viewer; transmitting by each client process to the server process the positon of the avatar associated with the client process; transmitting, by programmed software on Second Life server(s) that transmits position information of avatars in a region to other users' client processes that can view that region, to each of the client processes the positions of less than all of the avatars of other clients; and determining from the transmitted positions a set of avatars to be displayed to a user by its Second Life Viewer. *Id*. at 23-32.

105. This determining step includes the Second Life Viewer determining an actual number of avatars of other clients based on their positions as transmitted to the server process, a determination of the maximum number of avatars that can be displayed, and comparing the actual number to the maximum number to determine which of the other clients' avatars are to be

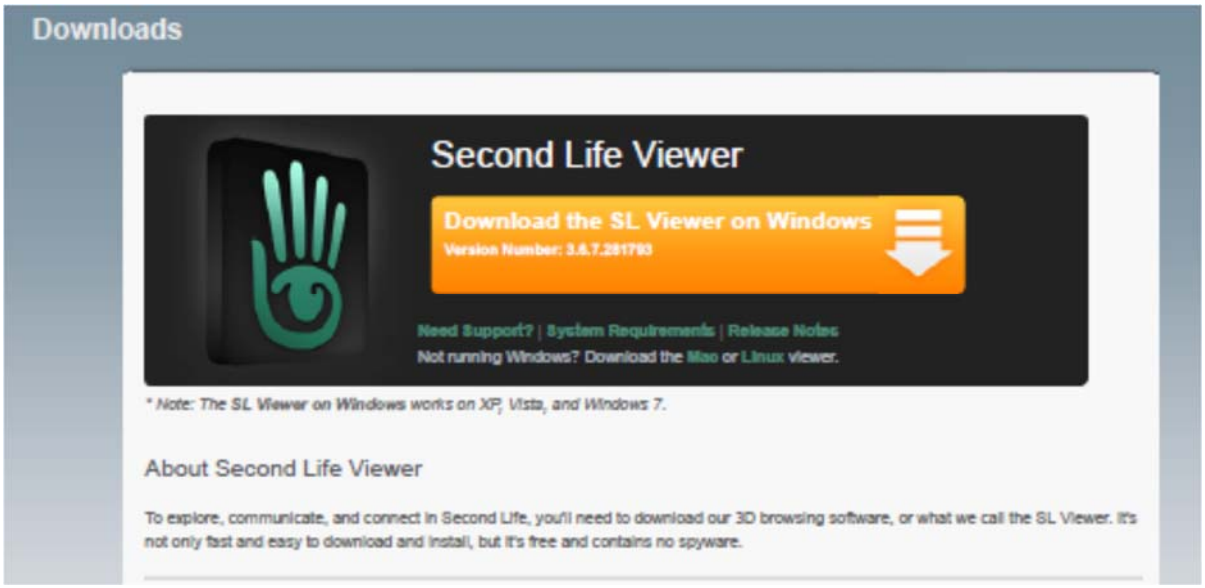
displayed. *Id*. at 34-44. From the received position information transmitted by the Second Life server(s), the Second Life Viewer ranks the other users' avatars by position, and compares each avatar's visibility rank (mVisibilityRank) to a variable, sMaxVisible to determine which of the other users' avatars are to be displayed. *Id*. The variable xMaxVisible is affected by control "RenderAvatarMaxVisible," which identifies the "Maximum number of avatars to display at any one time." *Id*.

106. Upon information and belief, Defendant Linden Lab also tested and used its accused products in a system and in the manner as described in paragraphs 103-105.

107. The performance of the method steps recited in claims 4 and 8 of the '690 Patent by the Second Life Viewer, addressed in paragraphs 99-101 and 103-105, are attributable to Linden Lab, who provides the client process's Second Life Viewer and is responsible for the client process's performance of the method steps. *Id*. at 7-9, 19-21, 32-34, 44-46.

108. Linden Lab conditions a user's participation in Second Life upon download and use of the Second Life Viewer, which performs the method steps attributable to the client process in claims 4 and 8, and the Second Life Viewer executed on the user's computer executes that code in the manner and according to the timing established by Linden Lab. *Id*.

109. Linden Lab instructs users desiring to enter the Second Life virtual world that it is necessary to download and install Linden Lab's Second Life Viewer. *Id*. ("To explore, communicate, and connect in Second Life, you'll need to download our 3D browsing software, or what we call the SL Viewer."),



110. To the extent any fact finder concludes that Defendant Linden's Accused Products do not literally satisfy any element of at least claims 4 and 8 of the '690 Patent, those elements are met under the Doctrine of Equivalents.

111. On information and belief, Linden Labs has received gross revenue from Second Life of approximately $50 to $100 million per year in each year from 2011 to 2016.

112. Defendant's acts of infringement have caused damage to Worlds, and Worlds is entitled to recover from Defendant the damages sustained as a result of Defendant's wrongful acts in an amount subject to proof at trial, but in any event not less than a reasonable royalty.

PRAYER FOR RELIEF

WHEREFORE, Worlds prays that it have judgment against Defendant for the following:

(1) Adjudging that Defendant has directly infringed at least claims 4 and 8 the '690 Patent under 35 U.S.C. § 271(a), either literally or under the Doctrine of Equivalents.

(2) Awarding Worlds damages for Defendant's infringement adequate to compensate Worlds for the infringement, but in any event, not less than a reasonable royalty;

(3) Awarding attorneys' fees pursuant to 35 U.S.C. § 285 or as otherwise permitted by law, and such other and further relief, at law or in equity, to which Worlds is justly entitled.

DEMAND FOR JURY TRIAL

Worlds hereby demands a jury trial on all issues so triable pursuant to Rule 38 of the Federal Rules of Civil Procedure.

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DATED: September 20, 2019

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