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IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

NASDAQ, INC.; NASDAQ TECHNOLOGY AB; Plaintiffs, v. IEX GROUP, INC.; INVESTORS EXCHANGE LLC; Defendants.	Civil Action No.: _____ **COMPLAINT AND DEMAND FOR JURY TRIAL**

COMPLAINT

Plaintiffs Nasdaq, Inc. ("Nasdaq") and Nasdaq Technology AB ("Nasdaq Technology") (collectively, "Plaintiffs" or the "Nasdaq Entities"), by and through their attorneys, and for their Complaint against IEX Group, Inc., and Investors Exchange LLC (collectively, "Defendants" or "IEX"), allege as follows.

INTRODUCTION

1. This is an action for patent infringement relating to electronic trading technologies.

2. Founded in 1971, Nasdaq was the world's first electronic stock market. Over the years, Nasdaq evolved into a company that not only operates its own markets (*e.g.*, the Nasdaq Stock Market), but also provides technology to other market operators.

3. Today, Nasdaq provides mission-critical technology solutions that power more than a hundred market infrastructure organizations across the globe. Nasdaq has invested heavily in research and development to improve the technologies upon which it and its customers rely. Nasdaq and its subsidiaries hold more than 250 patents covering these advancements.

4. IEX was founded in 2012, quickly developed the initial version of its electronic trading platform, and began operating the platform in 2013.

5. Nasdaq's technology plays a central role in the story of IEX's relatively quick launch. In 2012 and 2013, at least four key technology employees

left Nasdaq for IEX. These former Nasdaq employees helped build the earliest version of IEX's trading platform and continued to work on modifications thereafter. IEX has stated that its platform is designed to "maximize throughput" and to allow for "simplified scalability" and "[easily-expandable] system capacity."

6. All of the former Nasdaq employees who left for IEX were likely familiar with the four patented Nasdaq technologies at issue in this case: (1) closing auction processes, (2) multi-parallel order processing, (3) matching engine performance, and (4) data feed optimizations.

7. One example of Nasdaq's innovation and IEX's unauthorized borrowing can be seen with respect to closing auction technology.

8. Nasdaq launched its first fully-electronic closing auction in 2004, and subsequently obtained multiple patents protecting this important innovation, which includes dissemination of an electronic "order imbalance indicator," also known as the Net Order Imbalance Indicator or NOII.

9. Nasdaq's patented closing auction process facilitates trading during some of the busiest trading periods in the markets. For example, on June 23, 2017, the Nasdaq closing auction process executed trades involving 972 million shares across 2,499 securities in 0.861 seconds.

10. IEX has stated that its closing auction process was "designed based on extensive review of" Nasdaq's patented process. IEX has also stated that the information to be disseminated to the market during IEX closing auctions is "substantially similar" to the "Nasdaq Net Imbalance Order Indicator," a key feature of certain of the patents asserted here.

11. The law rewards Nasdaq's investment in innovation by providing it the exclusive right to its patented technologies during the patent periods. IEX has never obtained, nor even sought, a license to make, use, sell, or offer to sell Nasdaq's patented inventions. Nasdaq brings this lawsuit to stop, and obtain fair compensation for, IEX's unauthorized reliance on Nasdaq's technology.

12. Because at least one former Nasdaq employee involved in building IEX's trading system likely knew about the asserted patents or underlying applications, and because IEX has publicly acknowledged its reliance on Nasdaq technologies, Nasdaq seeks enhanced damages for willful infringement.

NATURE OF THE ACTION

13. This is an action under the patent laws of the United States, 35 U.S.C. §§ 1, *et seq*., for infringement by IEX of one or more claims of each of U.S. Patent Nos. 7,647,264, 7,895,112, 7,933,827, 8,117,609, 8,244,622, 8,280,797, and 8,386,362 (collectively referred to as the "Patents-in-Suit") (annexed hereto as Exhibits A through G, respectively).

PARTIES

14. Plaintiff Nasdaq, Inc. is a corporation organized and existing under the laws of the State of Delaware, with its principal place of business at One Liberty Plaza, 165 Broadway, New York, New York 10006.

15. Plaintiff Nasdaq Technology AB, a wholly-owned subsidiary of Nasdaq, Inc., is a corporation organized under the laws of Sweden, with its principal place of business at Tullvaktsvägen 15, SE-105 78 Stockholm, Sweden.

16. Defendant IEX Group, Inc. ("IEX Group") is a corporation organized under the laws of the State of Delaware, with its principal place of business at 4 World Trade Center, 44th Floor, New York, New York, 10007.

17. Defendant Investors Exchange, LLC ("Investors Exchange"), a wholly-owned subsidiary of IEX Group, is a limited liability company organized in Delaware, with its principal place of business at 4 World Trade Center, 44th Floor, New York, New York, 10007.

JURISDICTION AND VENUE

18. This Court has subject matter jurisdiction over the Nasdaq Entities' claims for patent infringement pursuant to the Federal Patent Act, 35 U.S.C. § 101 *et seq.* and 28 U.S.C. §§ 1331 and 1338(a).

19. This Court has personal jurisdiction over each of the Defendants

because, *inter alia*, (i) the Defendants have done and continue to do business in New Jersey, including regularly doing or soliciting business and engaging in other persistent courses of conduct, and/or deriving substantial revenue from goods and services provided to individuals in New Jersey; and (ii) the Defendants have committed and continue to commit acts of patent infringement in the State of New Jersey, including making, using, offering to sell, and/or selling accused products and services in New Jersey, and/or importing accused products into New Jersey, and/or inducing others to commit acts of patent infringement in New Jersey.

20. Venue is proper in this district pursuant to 28 U.S.C. § 1400(b) because, as set forth above, the Defendants have committed acts of infringement in New Jersey, and because the Defendants have regular and established places of business in New Jersey—specifically, IEX's primary trading platform is located in Weehawken, New Jersey, and the platform receives orders via a point of presence located in Secaucus, New Jersey.

THE PATENTS-IN-SUIT

21. On January 12, 2010, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 7,647,264 (the "'264 Patent"), entitled "Closing in an Electronic Market," based upon an application filed by inventors Frank Hatheway, Daniel F. Moore, Timothy E. Cox, Peter J. Martyn, Dan Barnard

Franks, Adam Seth Nunes, and Oliver Albers. Nasdaq is the assignee of the ’264 Patent.

22. On February 22, 2011, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 7,895,112 (the “’112 Patent”), entitled “Order Book Process and Method,” based upon an application filed by inventors James N. Richmann, Stuart Serkin, Timothy Vincent, Fred Stiening, John T. Hughes, Jr., and Daniel F. Moore. Nasdaq is the assignee of the ’112 Patent.

23. On April 26, 2011, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 7,933,827 (the “’827 Patent”), entitled “Multi-Parallel Architecture and A Method of Using the Same,” based upon an application filed by inventors James N. Richmann, Daniel F. Moore, John T. Hughes, Jr., Stuart Serkin, Timothy Vincent, Peter J. Martyn, and Mark DeNat. Nasdaq is the assignee of the ’827 Patent.

24. On February 14, 2012, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 8,117,609 (the “’609 Patent”), entitled “System and Method for Optimizing Changes of Data Sets,” based upon an application filed by inventors Staffan Lantz and Lars Jansson. Nasdaq Technology is the assignee of the ’609 Patent.

25. On August 14, 2012, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 8,244,622 (the “’622 Patent”), entitled

"Order Matching Process and Method," based upon an application filed by inventors John T. Hughes, Daniel F. Moore, Bruce E. Friedman, and Timothy Vincent. Nasdaq is the assignee of the '622 Patent.

26. On October 2, 2012, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 8,280,797 (the "'797 Patent"), entitled "Closing in an Electronic Market," based upon an application filed by inventors Frank Hatheway, Daniel F. Moore, Timothy E. Cox, Peter J. Martyn, Dan Barnard Franks, Adam Seth Nunes, and Oliver Albers. Nasdaq is the assignee of the '797 Patent.

27. On February 26, 2013, the United States Patent and Trademark Office duly and lawfully issued U.S. Patent No. 8,386,362 (the "'362 Patent"), entitled "Closing in an Electronic Market," based upon an application filed by inventors Santino Failla, Georgia Bilis, George David Easterbrook, Jr., and Timothy Vincent. Nasdaq is the assignee of the '362 Patent.

28. The Nasdaq Entities own all right, title, and interest in and to the Patents-in-Suit and possess all rights of recovery.

IEX'S KNOWLEDGE OF THE PATENTS-IN-SUIT

29. Upon information and belief, IEX acquired knowledge of the Patents-in-Suit years before this Complaint was filed.

30. IEX was founded in 2012; during 2012 and 2013, IEX hired at least four former Nasdaq technology employees familiar with the inventions described in the Patents-in-Suit.

31. Upon information and belief, at least one of the former Nasdaq employees hired by IEX had knowledge of one or more of the Patents-in-Suit.

32. Upon information and belief, such knowledge was obtained at least via the participation by such former employee(s) in the filing of Nasdaq-owned patent applications that incorporated by reference one or more of the Patents-in-Suit or the underlying applications.

33. Upon information and belief, the former Nasdaq employees hired by IEX contributed to the development of IEX's primary trading platform (the "Accused Trading Platform") starting in 2012; the earliest version of the Accused Trading Platform was launched in 2013.

34. In 2017, IEX made public statements regarding its procedures for conducting closing auctions.

35. Upon information and belief, at least one of the former Nasdaq employees hired by IEX contributed to the development of IEX's closing auction process.

36. IEX has stated that the design of its closing auction process is "based on extensive review of the auction designs of" other exchanges including Nasdaq,

and that certain aspects of IEX's auction process are designed to be "substantially similar to" Nasdaq's process.

COUNT I: INFRINGEMENT OF THE '264 PATENT

37. Plaintiffs incorporate the preceding paragraphs as if fully set forth herein.

38. As further described in the specification of the '264 Patent, the claims in this Patent generally relate to conducting closing auctions, including but not limited to determining and disseminating an order imbalance indicator (which includes simulated clearing prices, order imbalance information, and other information), in electronic trading systems.

39. As of the priority date of this Patent, it was not well-understood, routine, or conventional to determine or disseminate an order imbalance indicator in an electronic closing auction as described more fully in the claims of this Patent.

40. The order imbalance indicator addresses, among other problems, the technical problem of transparency—*i.e.*, how an electronic trading system can efficiently, effectively expose the data contained in the trading system to client systems that interact with the trading system. The dissemination of the order imbalance indicator addresses this problem even in high-volume trading periods.

41. Upon information and belief, IEX has infringed at least claims 1, 4, 5, 8, 9, 10, 11, 12, 13, 15, 17, 20, 21, 23, 26, 29, 31, 32, 34, 35, 36, 37, 38, 39, 41, 42,

43, 44, 47, 50, 51, 52, and 53 of the ’264 Patent pursuant to 35 U.S.C. § 271(a) by making, using, offering to sell, selling, and/or importing within the United States, without authority, an electronic system for trading of securities according to the invention, including, but not limited to, the Accused Platform and any other IEX platforms.

42. As an example, with regard to claim 1, upon information and belief, IEX’s Accused Platform is, or includes, an electronic system for trading of securities, the system comprising: a processor device; a memory storing a queue, the queue storing closing orders along with other orders for a traded security; a computer readable medium storing a computer program product, the computer program product comprising instructions to cause the server computer system to: receive the closing orders and the other orders for the security; disseminate an order imbalance indicator indicative of predicted trading characteristics of the security at close of trading, the predicted trading characteristics based upon a price at which those closing orders would execute at the time that the order imbalance indicator is disseminated; receive additional closing orders that maximize the number of shares executed at a predicted final closing price; determine a final closing price for the security based on marketable closing orders and other orders; and execute at least some of the closing orders at the determined final closing price.

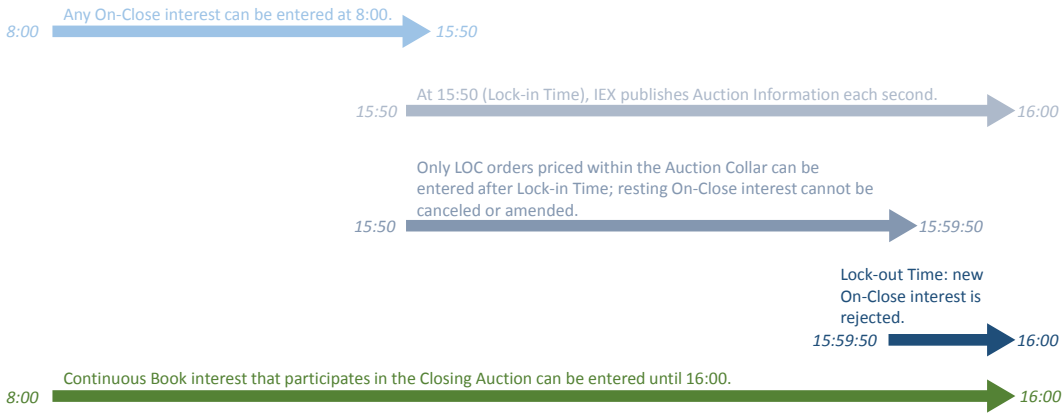
43. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

44. Using a further example, a published IEX patent application, U.S. Patent Publication No. US2015/0073967 (the "Speed Bump Application"), describes storing customer orders in an "incoming order process queue."

45. IEX's public statements indicate that IEX has implemented "Speed Bump" technology in its operations.

46. Using a further example, IEX's Auction Process Specification indicates that IEX's system is designed to receive and store closing orders in an "Auction Book," as well as other orders in a "Continuous Book."

47. Using a further example, a September 12, 2017 IEX presentation titled "Operational Guide for IEX Transition to Primary Listing Exchange" (the "Operational Guide") indicates that IEX's system is structured to disseminate Auction Information each second during specified periods of time before closing:



48. Using a further example, IEX's Operational Guide indicates that Auction Information to be disseminated by IEX includes information "indicat[ing] potential clearing prices for the auction"; this is confirmed in the Auction Process Specification, which states that such Auction Information includes the "Indicative Clearing Price: The single price at or within the Opening/Closing Auction Collar at which Auction Eligible Orders would match if the IEX Auction were to occur at the time of dissemination."

49. Using a further example, IEX has stated that "IEX Auction Information . . . is substantially similar to . . . the Nasdaq Net Imbalance Order Indicator," and that IEX's auction process, which was "designed based on extensive review of" Nasdaq's patented process, is "transparent, efficient, and robust."

50. Using a further example, IEX's Operational Guide indicates that IEX's system is designed to accept orders within a certain price range after the dissemination of Auction Information begins.

51. Using a further example, IEX's Rule Book indicates that IEX's system is designed to determine the Official Closing Price based on orders in the Auction Book as well as orders on the Continuous Book.

52. As another example, with regard to claim 17, upon information and belief, IEX's Accused Platform is, or includes, a computer program product for

electronically trading securities, the computer program product residing on a computer-readable medium comprising instructions for causing the computer to: receive closing orders and other orders for the security; disseminate an order imbalance indicator indicative of predicted trading characteristics of the security at close of trading, the predicted trading characteristics based upon a price at which those closing orders would execute at the time that the order imbalance indicator is disseminated; receive additional closing orders that maximize the number of shares executed at a predicted final closing price; determine a final closing price for the security based on marketable closing orders and other orders; and execute at least some of the closing orders at the determined final closing price.

53. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

54. Using a further example, IEX's Auction Process Specification indicates that IEX's system is designed to receive and store closing orders in an "Auction Book," as well as other orders in a "Continuous Book."

55. Using a further example, IEX's Operational Guide indicates that IEX's system is structured to disseminate Auction Information each second during specified periods of time before closing.

56. Using a further example, IEX's Operational Guide indicates that Auction Information to be disseminated by IEX includes information "indicat[ing] potential clearing prices for the auction"; this is confirmed in the Auction Process Specification, which states that such Auction Information includes the "Indicative Clearing Price: The single price at or within the Opening/Closing Auction Collar at which Auction Eligible Orders would match if the IEX Auction were to occur at the time of dissemination."

57. Using a further example, IEX has stated that "IEX Auction Information . . . is substantially similar to . . . the Nasdaq Net Imbalance Order Indicator," and that IEX's auction process, which was "designed based on extensive review of" Nasdaq's patented process, is "transparent, efficient, and robust."

58. Using a further example, IEX's Operational Guide indicates that IEX's system is designed to accept orders within a certain price range after the dissemination of Auction Information begins.

59. Using a further example, IEX's Rule Book indicates that IEX's system is designed to determine the Official Closing Price based on orders in the Auction Book as well as orders on the Continuous Book.

60. As another example, with regard to claim 26, upon information and belief, IEX's Accused Platform practices a computer implemented method for

electronically trading a security comprising: receiving, at a computer, closing orders and other orders for the security; disseminating an order imbalance indicator indicative of predicted trading characteristics of the security at the close of trading, the predicted trading characteristics based upon a price at which those closing orders would execute at the time that the order imbalance indicator is disseminated; receiving additional closing orders that maximize the number of shares executed at a predicted final closing price; determining a final closing price for the security based on the marketable closing orders and other orders; and executing at least some of the closing orders at the determined final closing price.

61. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

62. Using a further example, IEX's Auction Process Specification indicates that IEX's system is designed to receive and store closing orders in an "Auction Book," as well as other orders in a "Continuous Book."

63. Using a further example, IEX's Operational Guide indicates that IEX's system is structured to disseminate Auction Information each second during specified periods of time before closing.

64. Using a further example, IEX's Operational Guide indicates that Auction Information to be disseminated by IEX includes information "indicat[ing]

potential clearing prices for the auction"; this is confirmed in the Auction Process Specification, which states that such Auction Information includes the "Indicative Clearing Price: The single price at or within the Opening/Closing Auction Collar at which Auction Eligible Orders would match if the IEX Auction were to occur at the time of dissemination."

65. Using a further example, IEX has stated that "IEX Auction Information . . . is substantially similar to . . . the Nasdaq Net Imbalance Order Indicator," and that IEX's auction process, which was "designed based on extensive review of" Nasdaq's patented process, is "transparent, efficient, and robust."

66. Using a further example, IEX's Operational Guide indicates that IEX's system is designed to accept orders within a certain price range after the dissemination of Auction Information begins.

67. Using a further example, IEX's Rule Book indicates that IEX's system is designed to determine the Official Closing Price based on orders in the Auction Book as well as orders on the Continuous Book.

68. As another example, with regard to claim 44, upon information and belief, IEX's Accused Platform practices a computer implemented method for electronically trading a security comprising: receiving, at a computer, closing orders and other orders for the security; disseminating an order imbalance indicator

including a price at which the closing orders would execute at the time that the order imbalance indicator is disseminated; determining a closing price for the security based on the closing orders and the other orders, where determining the closing price comprises: determining a preliminary closing price: determining a price where a maximum number of shares of closing orders will execute, comparing the preliminary closing price to a benchmark value representing market conditions prior to the close of trading, and determining the final closing price based on the comparison; and executing at least some of the closing orders at the determined final closing price.

69. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

70. Using a further example, IEX's Auction Process Specification indicates that IEX's system is designed to receive and store closing orders in an "Auction Book," as well as other orders in a "Continuous Book."

71. Using a further example, IEX's Operational Guide indicates that IEX's system is structured to disseminate Auction Information each second during specified periods of time before closing.

72. Using a further example, IEX's Operational Guide indicates that Auction Information to be disseminated by IEX includes information "indicat[ing]

potential clearing prices for the auction"; this is confirmed in the Auction Process Specification, which states that such Auction Information includes the "Indicative Clearing Price: The single price at or within the Opening/Closing Auction Collar at which Auction Eligible Orders would match if the IEX Auction were to occur at the time of dissemination."

73. Using a further example, IEX has stated that "IEX Auction Information . . . is substantially similar to . . . the Nasdaq Net Imbalance Order Indicator," and that IEX's auction process, which was "designed based on extensive review of" Nasdaq's patented process, is "transparent, efficient, and robust."

74. Using a further example, IEX's Operational Guide indicates that IEX's system is designed to accept orders within a certain price range after the dissemination of Auction Information begins.

75. Using a further example, IEX's Rule Book indicates that IEX's system is designed to determine the Official Closing Price by, initially, determining "the price that maximizes the number of shares of Auction Eligible Orders to be executed."

76. Using a further example, IEX's Rule Book also indicates that IEX's system is designed to compare this preliminary closing price to "the

Opening/Closing Auction Collar," a benchmark value representing market conditions prior to the close of trading.

77. Using a further example, IEX's Rule Book indicates that the Official Closing Price may change from the preliminary closing price based on this comparison.

78. As another example, with regard to claim 47, upon information and belief, IEX's Accused Platform is, or includes, a system for electronically trading securities comprising: a processor device; a device storing a queue, the queue storing closing orders along with other orders for a traded security; a computer readable medium storing a computer program product, the computer program product comprising instructions to cause the system to: receive the closing orders and the other orders for the security; disseminate an order imbalance indicator including a price at which the closing orders would execute at the time that the order imbalance indicator is disseminated; determine a final closing price for the security based on the closing orders and the other orders by: determining a preliminary closing price where a maximum number of shares of closing orders will execute, comparing the preliminary closing price to a benchmark value representing market conditions prior to the close of trading, and determining the final closing price based on the comparison; and execute at least some of the closing orders at the determined final closing price.

79. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

80. Using a further example, the Speed Bump Application indicates that IEX stores customer orders in an "incoming order process queue."

81. Using a further example, IEX's Auction Process Specification indicates that IEX's system is designed to receive and store closing orders in an "Auction Book," as well as other orders in a "Continuous Book."

82. Using a further example, IEX's Operational Guide indicates that IEX's system is structured to disseminate Auction Information each second during specified periods of time before closing.

83. Using a further example, IEX's Operational Guide indicates that Auction Information to be disseminated by IEX includes information "indicat[ing] potential clearing prices for the auction"; this is confirmed in the Auction Process Specification, which states that such Auction Information includes the "Indicative Clearing Price: The single price at or within the Opening/Closing Auction Collar at which Auction Eligible Orders would match if the IEX Auction were to occur at the time of dissemination."

84. Using a further example, IEX has stated that "IEX Auction Information . . . is substantially similar to . . . the Nasdaq Net Imbalance Order

Indicator," and that IEX's auction process, which was "designed based on extensive review of" Nasdaq's patented process, is "transparent, efficient, and robust."

85. Using a further example, IEX's Rule Book indicates that IEX's system is designed to determine the Official Closing Price by, initially, determining "the price that maximizes the number of shares of Auction Eligible Orders to be executed."

86. Using a further example, IEX's Rule Book also indicates that IEX's system is designed to compare this preliminary closing price to "the Opening/Closing Auction Collar," a benchmark value representing market conditions prior to the close of trading.

87. Using a further example, IEX's Rule Book indicates that the Official Closing Price may change from the preliminary closing price based on this comparison.

88. As another example, with regard to claim 50, upon information and belief, IEX's Accused Platform is, or includes, a computer program product for electronically trading securities, the computer program product residing on a computer readable medium comprising instructions for causing a computer to: receive closing orders and other orders for a security; disseminate an order imbalance indicator including a price at which the closing orders would execute at

the time that the order imbalance indicator is disseminated; determine a final closing price for the security based on the closing orders and the other orders by: determining a preliminary closing price where a maximum number of shares of closing orders will execute, comparing the preliminary closing price to a benchmark value representing market conditions prior to the close of trading, and determining the final closing price based on the comparison; and execute at least some of the closing orders at the determined final closing price.

89. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

90. Using a further example, IEX's Auction Process Specification indicates that IEX's system is designed to receive and store closing orders in an "Auction Book," as well as other orders in a "Continuous Book."

91. Using a further example, IEX's Operational Guide indicates that IEX's system is structured to disseminate Auction Information each second during specified periods of time before closing.

92. Using a further example, IEX's Operational Guide indicates that Auction Information to be disseminated by IEX includes information "indicat[ing] potential clearing prices for the auction"; this is confirmed in the Auction Process Specification, which states that such Auction Information includes the "Indicative

Clearing Price: The single price at or within the Opening/Closing Auction Collar at which Auction Eligible Orders would match if the IEX Auction were to occur at the time of dissemination."

93. Using a further example, IEX has stated that "IEX Auction Information . . . is substantially similar to . . . the Nasdaq Net Imbalance Order Indicator," and that IEX's auction process, which was "designed based on extensive review of" Nasdaq's patented process, is "transparent, efficient, and robust."

94. Using a further example, IEX's Rule Book indicates that IEX's system is designed to determine the Official Closing Price by, initially, determining "the price that maximizes the number of shares of Auction Eligible Orders to be executed."

95. Using a further example, IEX's Rule Book also indicates that IEX's system is designed to compare this preliminary closing price to "the Opening/Closing Auction Collar," a benchmark value representing market conditions prior to the close of trading.

96. Using a further example, IEX's Rule Book indicates that the Official Closing Price may change from the preliminary closing price based on this comparison.

97. Upon information and belief, IEX's infringement pursuant to 35 U.S.C. § 271(a) is ongoing.

98. Upon information and belief, IEX has induced infringement of at least the foregoing claims of the '264 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, their consultants, software developers, engineers, customers, repair providers, and end users (such as primary market makers, competitive market makers, and broker-dealers) to make, use, sell, offer to sell, and/or import within the United States, an automated platform made in accordance with the '264 Patent, including, but not limited to, the Accused Platform, by, among other things, providing access, instructions, and technical assistance relating to the Accused Platform on IEX websites. Upon information and belief, IEX's inducement of infringement pursuant to 35 U.S.C. § 271(b) is ongoing.

99. Upon information and belief, IEX has committed the foregoing infringing activities without license from Nasdaq and with notice of the '264 Patent.

100. IEX knew the '264 Patent existed while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the '264 Patent. Nasdaq's damages should be trebled pursuant to 35 U.S.C. § 284 because of IEX's willful infringement of the '264 Patent.

101. The acts of infringement by IEX have been performed with the knowledge of the ’264 Patent and are willful, wanton and deliberate, thus rendering this action “exceptional” within the meaning of 35 U.S.C. § 285 and entitling Nasdaq to its reasonable attorney’s fees and litigation expenses.

102. The acts of infringement by IEX will continue unless enjoined by this Court.

103. Nasdaq has been and will continue to be irreparably harmed and damaged by IEX’s acts of infringement of the ’264 Patent and has no adequate remedy at law.

COUNT II: INFRINGEMENT OF THE ’797 PATENT

104. Plaintiffs incorporate the preceding paragraphs as if fully set forth herein.

105. As further described in the specification of the ’797 Patent, the claims in this Patent generally relate to conducting closing auctions, including but not limited to determining and disseminating an order imbalance indicator (which includes simulated clearing prices, order imbalance information, and other information), in electronic trading systems.

106. As of the priority date of this Patent, it was not well-understood, routine, or conventional to determine or disseminate an order imbalance indicator in an electronic closing auction as described more fully in the claims of this Patent.

107. The order imbalance indicator addresses, among other problems, the technical problem of transparency—*i.e.*, how an electronic trading system can efficiently, effectively expose the data contained in the trading system to client systems that interact with the trading system. The dissemination of the order imbalance indicator addresses this problem even in high-volume trading periods.

108. Upon information and belief, IEX has infringed at least claims 1, 4, 5, 6, 7, 8, 12, 17, 18, and 19 of the '797 Patent pursuant to 35 U.S.C. § 271(a) by making, using, offering to sell, selling, and/or importing within the United States, without authority, products or services practicing a computer implemented method for trading securities in an electronic market according to the invention, including, but not limited to, the Accused Platform.

109. As an example, with regard to claim 1, upon information and belief, IEX's Accused Platform practices a computer implemented method for trading a security in an electronic market, comprising: receiving by one or more computers closing orders and other orders for the security traded in the electronic market; determining by one or more computers an order imbalance indicator indicative of predicted trading characteristics of the security at the close of trading; disseminating by the one or more computers the order imbalance indicator, the predicted trading characteristics being based on upon a price at which those closing orders would execute at a particular time before the close of trading; determining

by the one or more computers a closing price for the security based on the closing orders and other orders; and executing by the one or more computers at least some of the closing orders at the determined closing price.

110. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

111. Using a further example, IEX's Auction Process Specification indicates that IEX's system is designed to receive and store closing orders in an "Auction Book," as well as other orders in a "Continuous Book."

112. Using a further example, IEX's Operational Guide indicates that IEX's system is structured to disseminate Auction Information each second during specified periods of time before closing.

113. Using a further example, IEX's Operational Guide indicates that Auction Information to be disseminated by IEX includes information "indicat[ing] potential clearing prices for the auction"; this is confirmed in the Auction Process Specification, which states that such Auction Information includes the "Indicative Clearing Price: The single price at or within the Opening/Closing Auction Collar at which Auction Eligible Orders would match if the IEX Auction were to occur at the time of dissemination."

114. Using a further example, IEX has stated that "IEX Auction Information . . . is substantially similar to . . . the Nasdaq Net Imbalance Order Indicator," and that IEX's auction process, which was "designed based on extensive review of" Nasdaq's patented process, is "transparent, efficient, and robust."

115. Using a further example, IEX's Rule Book indicates that IEX's system is designed to determine the Official Closing Price based on orders in the Auction Book as well as orders on the Continuous Book.

116. As another example, with regard to claim 12, upon information and belief, IEX's Accused Platform is, or includes, a computer program product tangibly embodied on a computer-readable storage device for use in an electronic market for trading of securities comprises instructions for causing a processor to: receive closing orders and other orders for the security traded in the electronic market; determine an order imbalance indicator indicative of predicted trading characteristics of the security at the close of trading; disseminate the order imbalance indicator, the predicted trading characteristics being based on upon a price at which those closing orders would execute at a particular time before the close of trading; determine a closing price for the security based on the closing orders and other orders; and execute at least some of the closing orders at the determined closing price.

117. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

118. Using a further example, IEX's Auction Process Specification indicates that IEX's system is designed to receive and store closing orders in an "Auction Book," as well as other orders in a "Continuous Book."

119. Using a further example, IEX's Operational Guide indicates that IEX's system is structured to disseminate Auction Information each second during specified periods of time before closing.

120. Using a further example, IEX's Operational Guide indicates that Auction Information to be disseminated by IEX includes information "indicat[ing] potential clearing prices for the auction"; this is confirmed in the Auction Process Specification, which states that such Auction Information includes the "Indicative Clearing Price: The single price at or within the Opening/Closing Auction Collar at which Auction Eligible Orders would match if the IEX Auction were to occur at the time of dissemination."

121. Using a further example, IEX has stated that "IEX Auction Information . . . is substantially similar to . . . the Nasdaq Net Imbalance Order Indicator," and that IEX's auction process, which was "designed based on

extensive review of" Nasdaq's patented process, is "transparent, efficient, and robust."

122. Using a further example, IEX's Rule Book indicates that IEX's system is designed to determine the Official Closing Price based on orders in the Auction Book as well as orders on the Continuous Book.

123. As another example, with regard to claim 17, upon information and belief, IEX's Accused Platform is, or includes, a system comprising: a server system, the server system comprising a processor; and a memory for storing instructions which when executed cause the processor to: publish over a computer network prior to a close of trading in an electronic trading venue, an information data stream to computer systems, the information data stream comprising at least one of: an inside match price based on an imbalance of closing orders received by the electronic trading venue; or a near indicative clearing price for a closing price if the market were to close at a time when the near indicative clearing price is determined, wherein the inside match price is selected from an inside bid price, an insider offer price, an inside bid-offer midpoint price, or zero, based on an imbalance of closing orders, wherein the near indicative clearing price further comprises a determined price at which closing orders and other orders would execute if paired with each other.

124. To illustrate using an example, IEX's Auction Process Specification indicates that IEX Auction Information to be disseminated by IEX includes the Reference Price, the price inside the Reference Price Range at which orders from the Auction Book would match.

125. As a further example, IEX's Auction Process Specification indicates that IEX Auction Information also includes Paired Shares, Imbalance Shares, and Imbalance Side.

126. Upon information and belief, IEX's infringement pursuant to 35 U.S.C. § 271(a) is ongoing.

127. Upon information and belief, IEX has induced infringement of at least the foregoing claims of the '797 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, their consultants, software developers, engineers, customers, repair providers, and end users (such as primary market makers, competitive market makers, and broker-dealers) to make, use, sell, offer to sell, and/or import within the United States, an automated platform made in accordance with the '797 Patent, including, but not limited to, the Accused Platform, by, among other things, providing access, instructions, and technical assistance relating to the Accused Platform on IEX websites. Upon information and belief, IEX's inducement of infringement pursuant to 35 U.S.C. § 271(b) is ongoing.

128. Upon information and belief, IEX has committed the foregoing infringing activities without license from Nasdaq and with notice of the ’797 Patent.

129. IEX knew the ’797 Patent existed while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the ’797 Patent. Nasdaq’s damages should be trebled pursuant to 35 U.S.C. § 284 because of IEX’s willful infringement of the ’797 Patent.

130. The acts of infringement by IEX have been performed with the knowledge of the ’797 Patent and are willful, wanton and deliberate, thus rendering this action “exceptional” within the meaning of 35 U.S.C. § 285 and entitling Nasdaq to its reasonable attorney’s fees and litigation expenses.

131. The acts of infringement by IEX will continue unless enjoined by this Court.

132. Nasdaq has been and will continue to be irreparably harmed and damaged by IEX’s acts of infringement of the ’797 Patent and has no adequate remedy at law.

COUNT III: INFRINGEMENT OF THE ’827 PATENT

133. Plaintiffs incorporate the preceding paragraphs as if fully set forth herein.

134. As further described in the specification of the ’827 Patent, the claims in this Patent generally relate to multi-parallel order processing technology (also referred to as “split engine” technology) for electronic trading systems.

135. As of the priority date of this Patent, it was not well-understood, routine, or conventional for trading systems to perform multi-parallel order processing as described more fully in the claims of this Patent.

136. Conventional trading systems as of the priority date of this Patent did not balance the load in the system across multiple “securities processors” assigned by unique security identifiers, as described more fully in the claims of this Patent.

137. The advantages conferred by this technology over prior conventional technologies include, but are not limited to increasing throughput and trade volume handling; increasing processing efficiency; reducing interruptions in trading; and improving system adaptability, stability, scalability, and determinism.

138. Upon information and belief, IEX has infringed at least claims 1, 2, 3, 5, 6, 7, 8, 9, 12, 14, 15, 16, 21, 22, 23, 24, 25, 33, 34, 35, 36, 38, 39, 40, 41, 42, 43, 52, 53, 54, 55, 56, 59, 67, 68, 69, 70, 71, and 72 of the ’827 Patent pursuant to 35 U.S.C. § 271(a) by making, using, offering to sell, selling, and/or importing within the United States, without authority, a system for securities trading according to the invention, including, but not limited to, the Accused Platform.

139. As an example, with regard to claim 1, upon information and belief, IEX's Accused Platform is, or includes, a system for securities trading, the system comprising: a plurality of securities processors for processing attributable security interest messages generated by market participants, the attributable security interest messages relate to securities traded on the securities trading system, each security is assigned to one or more of the securities processors based on a unique security identifier associated with the security; and an order routing system for routing each attributable security interest message to one of the securities processors according to the assignment.

140. To illustrate using an example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities with a continuous, automatic matching function," and describes the Accused Platform as "the System."

141. Using a further example, IEX's User Manual states that "[a]t the core of [IEX's] System are several matching engines" used to processes "incoming orders" from "Users."

142. Using a further example, IEX's User Manual states that, in IEX's system, "[e]ach matching engine handles a set of symbols."

143. Using a further example, IEX's User Manual states that, in IEX's system, "order entry gateways validate incoming orders . . . and forward them to the appropriate matching engine."

144. As another example, with regard to claim 34, upon information and belief, IEX's Accused Platform practices a computer-implemented method comprising: processing attributable security interest messages generated by market participants on a plurality of securities processors of a server computer, the attributable security interest messages relate to securities traded on a securities trading system, with each individual security assigned to one or more of the securities processors based on a unique security identifier associated with the security; and routing, through an order routing system, each attributable security interest message to one of the securities processors according to the assignment.

145. To illustrate using an example, IEX's User Manual acknowledges that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities with a continuous, automatic matching function," and that "[a]t the core of [IEX's] System are several matching engines" used to processes "incoming orders" from "Users."

146. Using a further example, IEX's User Manual states that, in IEX's system, "[e]ach matching engine handles a set of symbols."

147. Using a further example, IEX's User Manual states that, in IEX's system, "order entry gateways validate incoming orders . . . and forward them to the appropriate matching engine."

148. As another example, with regard to claim 67, upon information and belief, IEX's Accused Platform is, or includes, a computer program product residing on a computer readable storage device for processing of messages for trading of securities in an electronic trading venue, the computer program product comprising instructions which, when executed by the processor, cause that processor to: process, on a plurality of securities processors, attributable security interest messages generated by market participants, each attributable security interest message having a unique security identifier that identifies that message as pertaining to a specific security of a plurality of securities traded on a securities trading system, wherein each individual security is assigned to one or more of the securities processors based on the unique security identifier; and route a received attributable security interest message to one of a plurality of processors, according to an pre-configured, assignment of processors for processing of the security interest message based on an unique security identifier.

149. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

150. Using a further example, IEX's User Manual states that "[a]t the core of [IEX's] System are several matching engines, and "[e]ach matching engine handles a set of symbols."

151. Using a further example, IEX's User Manual states that, in IEX's system, "order entry gateways validate incoming orders . . . and forward them to the appropriate matching engine," and "[e]ach matching engine handles of a set of symbols, which can be reallocated to balance the load across the System."

152. Upon information and belief, IEX's infringement pursuant to 35 U.S.C. § 271(a) is ongoing.

153. Upon information and belief, IEX has induced infringement of at least the foregoing claims of the '827 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, their consultants, software developers, engineers, customers, repair providers, and end users (such as primary market makers, competitive market makers, and broker-dealers) to make, use, sell, offer to sell, and/or import within the United States, an automated platform made in accordance with the '827 Patent, including, but not limited to, the Accused Platform, by, among other things, providing access, instructions, and technical assistance relating to the Accused Platform on IEX websites. Upon information and belief, IEX's inducement of infringement pursuant to 35 U.S.C. § 271(b) is ongoing.

154. Upon information and belief, IEX has committed the foregoing infringing activities without license from Nasdaq and with notice of the ’827 Patent.

155. IEX knew the ’827 Patent existed while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the ’827 Patent. Nasdaq’s damages should be trebled pursuant to 35 U.S.C. § 284 because of IEX’s willful infringement of the ’827 Patent.

156. The acts of infringement by IEX have been performed with the knowledge of the ’827 Patent and are willful, wanton and deliberate, thus rendering this action “exceptional” within the meaning of 35 U.S.C. § 285 and entitling Nasdaq to its reasonable attorney’s fees and litigation expenses.

157. The acts of infringement by IEX will continue unless enjoined by this Court. Nasdaq has been and will continue to be irreparably harmed and damaged by IEX’s acts of infringement of the ’827 Patent and has no adequate remedy at law.

COUNT IV: INFRINGEMENT OF THE ’112 PATENT

158. Plaintiffs incorporate the preceding paragraphs as if fully set forth herein.

159. As further described in the specification of the ’112 Patent, the claims in this Patent generally relate to electronic trading system matching engine performance.

160. The technology described in this Patent involves, among other features, managing an order book that is stored in main memory, limiting how the order book is accessed in the main memory (*i.e.*, “order book isolation”), and storing other data in media that are not subject to the same access limitation.

161. As of the priority date of this Patent, such features, described more fully in the claims of this Patent, were not well-understood, routine, or conventional.

162. The “traditional file based approaches” commonly in use before this Patent’s priority date were much less performant than the approaches described in this Patent.

163. The advantages conferred by the technology described in this Patent over prior conventional technologies include, but are not limited to, increased throughput, scalability, reliability, and determinism.

164. Upon information and belief, IEX has infringed at least claims 1, 2, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 21, 22, 24, 25, 26, 27, 29, and 30 of the ’112 Patent pursuant to 35 U.S.C. § 271(a) by making, using, offering to sell, selling, and/or importing within the United States, without authority, products or

services practicing a method for trading securities according to the invention, including, but not limited to, the Accused Platform.

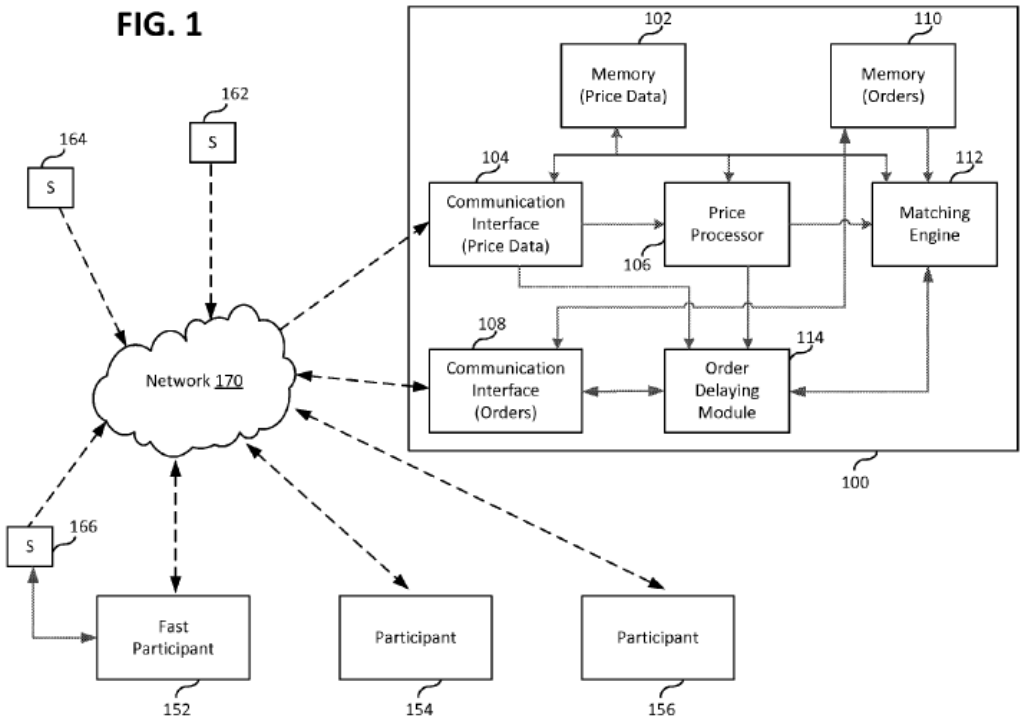
165. As an example, with regard to claim 1, upon information and belief, IEX's Accused Platform is, or includes, a computer system for execution of transactions involving execution of orders for securities, the computer system comprises: a central processor device; a sequential access storage device that provides a persistent store of recorded information; a main memory coupled to the central processor and the main memory storing: an order book that includes order and/or quotes for a particular security, the orders and/or quotes having various prices, sizes and time priorities; executable code that causes the processor device to match the orders and/or quotes in the order book for the security to a received order for the security, with the order book only accessible by the executable code that matches orders and/or quotes; and the executable code that matches further comprising: order management executable code that sends a message to report matching of the received order, or a portion of the received order, to orders and/or quotes in the order book to an order activity log file located in the sequential access storage device.

166. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

167. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

168. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

169. Using a further example, another published IEX patent application, U.S. Patent Publication No. 2015/0302441 (the "True Price Application"), describes storage of the order book in memory (110 as shown in Fig. 1 below):



170. IEX's public statements indicate that IEX has implemented "True Price" technology in its operations.

171. Using a further example, the above diagram in the True Price Application suggests that in IEX's system, the order book can only be accessed by the matching engine (112) and is isolated from other portions of the code that run in the system.

172. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine 112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

173. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a sequential access storage device such as a hard drive.

174. Using a further example, another published IEX patent application, U.S. Patent Publication No. 2015/ 0261625 (the "Message Retransmission Mechanism Application"), describes a system in which, after a match is made by a matching engine, information regarding the match is stored in the system's "master journal," which would be stored in a sequential access storage device such as a hard drive.

175. IEX's public statements indicate that IEX has implemented the technology described in the Message Retransmission Mechanism Application in IEX's operations.

176. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application (5 21 below):

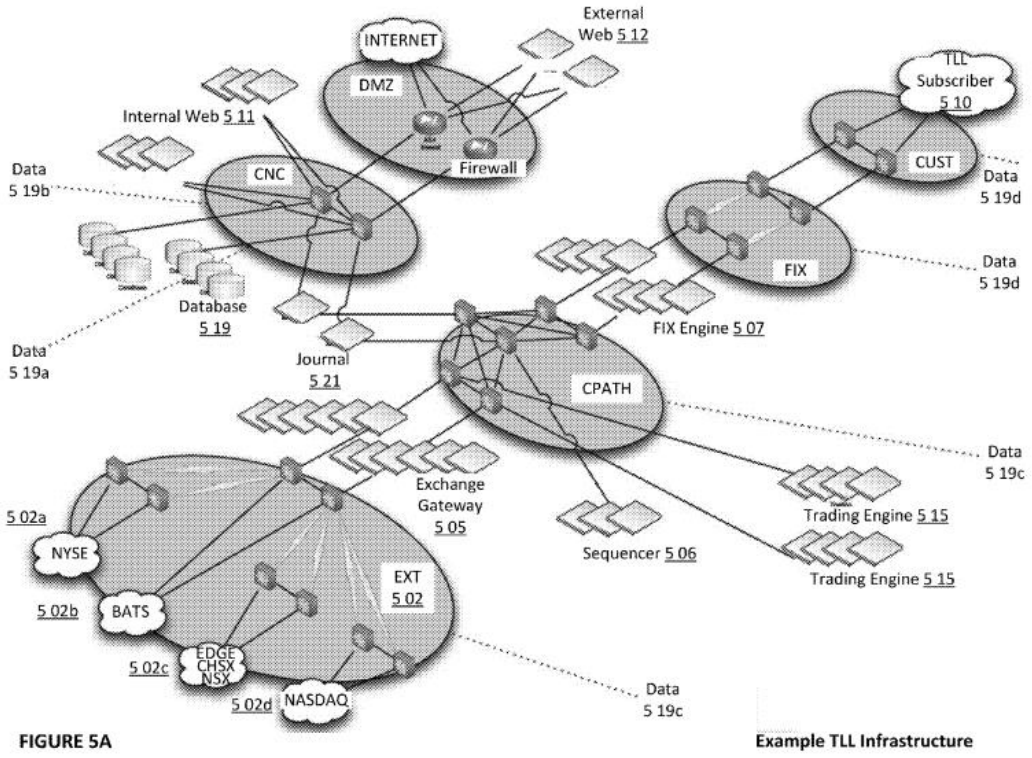


FIGURE 5A Example TLL Infrastructure

177. As another example, with regard to claim 11, upon information and belief, IEX's Accused Platform practices a computer implemented method for trading securities in an electronic trading venue, the method comprising: storing by one or more computers an order book representing trading interest comprising orders and/or quotes of at least one security in a main memory of at least one of the

one or more computer systems, with the computer systems further comprising a persistent sequential access storage device; and matching, using the at least one computer system, a portion of the security trading interest in the order book stored in the main memory to a received order for the security represented in the order book, with the order book only accessible during matching by executable code that causes the matching of the orders and/or quotes; and sending by the computer performing the matching, a message to report the matching of the received order, or a portion of the received order, to the orders and/or quotes in the order book, to an order activity log file located in the persistent sequential access storage device.

178. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

179. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

180. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

181. Using a further example, Figure 1 in the True Price Application indicates that IEX stores its order book in memory.

182. Using a further example, Figure 1 in the True Price Application suggests that in IEX's system, the order book can only be accessed by specific portions of the code that run in the system (such as the matching engine 112), and is isolated from other portions of the code that run in the system.

183. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine 112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

184. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a sequential access storage device such as a hard drive.

185. Using a further example, the Message Retransmission Mechanism Application indicates that, after a match is made by the IEX matching engine, the information regarding the match is stored in the system's "master journal," which would be stored in a persistent sequential access storage device such as a hard drive.

186. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application.

187. With regard to claim 21, upon information and belief, IEX's Accused Platform is, or includes, a computer program product residing on a computer readable medium for trading securities in an electronic trading venue, the computer program product comprises instructions to cause a computer to: store an order book representing trading interest of at least one security in a main memory of a computer system; match a portion of the security trading interest in the order book stored in the main memory to a received order for a security represented in the order book with the order book only accessible during a match by the instructions that match orders and/or quotes; and send a message to report the match of the received order or a portion of the received order to the orders and/or quotes in the order book to an order activity log file located in a persistent sequential access storage device associated with the computer.

188. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

189. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

190. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

191. Using a further example, Figure 1 in the True Price Application indicates that IEX stores its order book in memory.

192. Using a further example, Figure 1 in the True Price Application suggests that in IEX's system, the order book can only be accessed by specific portions of the code that run in the system (such as the matching engine 112), and is isolated from other portions of the code that run in the system.

193. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine 112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

194. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a sequential access storage device such as a hard drive.

195. Using a further example, the Message Retransmission Mechanism Application indicates that, after a match is made by the IEX matching engine, the

information regarding the match is stored in the system's "master journal," which would be stored in a persistent sequential access storage device such as a hard drive.

196. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application.

197. Upon information and belief, IEX's infringement pursuant to 35 U.S.C. § 271(a) is ongoing.

198. Upon information and belief, IEX has induced infringement of at least the foregoing claims of the '112 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, their consultants, software developers, engineers, customers, repair providers, and end users (such as primary market makers, competitive market makers, and broker-dealers) to make, use, sell, offer to sell, and/or import within the United States, an automated platform made in accordance with the '112 Patent, including, but not limited to, the Accused Platform, by, among other things, providing access, instructions, and technical assistance relating to the Accused Platform on IEX websites. Upon information and belief, IEX's inducement of infringement pursuant to 35 U.S.C. § 271(b) is ongoing.

199. Upon information and belief, IEX has committed the foregoing infringing activities without license from Nasdaq and with notice of the ’112 Patent.

200. IEX knew the ’112 Patent existed while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the ’112 Patent. Nasdaq’s damages should be trebled pursuant to 35 U.S.C. § 284 because of IEX’s willful infringement of the ’264 Patent.

201. The acts of infringement by IEX have been performed with the knowledge of the ’112 Patent and are willful, wanton and deliberate, thus rendering this action “exceptional” within the meaning of 35 U.S.C. § 285 and entitling Nasdaq to its reasonable attorney’s fees and litigation expenses.

202. The acts of infringement by IEX will continue unless enjoined by this Court.

203. Nasdaq has been and will continue to be irreparably harmed and damaged by IEX’s acts of infringement of the ’112 Patent and has no adequate remedy at law.

COUNT V: INFRINGEMENT OF THE ’622 PATENT

204. Plaintiffs incorporate the preceding paragraphs as if fully set forth herein.

205. As further described in the specification of the ’622 Patent, the claims in this Patent generally relate to electronic trading system matching engine performance.

206. The technology described in this Patent involves, among other features, managing an order book that is stored in main memory, limiting how the order book is accessed in the main memory (*i.e.*, “order book isolation”), and storing other data in media that are not subject to the same access limitation.

207. As of the priority date of this Patent, such features, described more fully in the claims of this Patent, were not well-understood, routine, or conventional.

208. The “traditional file based approaches” commonly in use before this Patent’s priority date were much less performant than the approaches described in this Patent.

209. The advantages conferred by the technology described in this Patent over prior conventional technologies include, but are not limited to, increased throughput, scalability, reliability, and determinism.

210. Upon information and belief, IEX has infringed at least claims 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, and 30 of the ’622 Patent pursuant to 35 U.S.C. § 271(a) by making, using, offering to sell, selling, and/or importing within the United States, without

authority, products or services practicing a computer implemented method for trading securities in an electronic market according to the invention, including, but not limited to, the Accused Platform.

211. As an example, with regard to claim 1, upon information and belief, IEX's Accused Platform is, or includes, a computer system for trading securities in an electronic trading venue, the computer system comprises: a processor; a main memory that stores: an order book, the order book comprising a plurality of unfulfilled orders to trade a particular security that trades on the electronic trading venue, with the orders sent for execution against contra side interest; and a first portion of a computer system product that accesses the order book comprising instructions to: find the orders in the order book that can be matched to a received order sent to the electronic trading venue; match a portion of a received order for a security against one or more orders stored in the order book that resides in the main memory, with the first portion of the computer program having exclusive access to the order book; and a remaining portion of a computer program product to access a log stored in a persistent storage device and to process activities related to the processing of securities other than to match the received order to orders in the order book, with the remaining portion having access to the order book in the main memory only through the first portion of the computer program product; one or more persistent, computer readable storage device that store the computer program

product and the log to store results of related to processing of securities other than to match the received order to orders stored in the order book.

212. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

213. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

214. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

215. Using a further example, Figure 1 in the True Price Application indicates that IEX stores its order book in memory.

216. Using a further example, Figure 1 in the True Price Application suggests that in IEX's system, the order book can only be accessed by specific portions of the code that run in the system (such as the matching engine 112), and is isolated from other portions of the code that run in the system.

217. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine

112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

218. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a persistent storage device such as a hard drive.

219. Using a further example, the Message Retransmission Mechanism Application indicates that, after a match is made by the IEX matching engine, the information regarding the match is stored in the system's "master journal," which would be stored in a persistent storage device such as a hard drive.

220. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application.

221. As another example, with regard to claim 11, upon information and belief, IEX's Accused Platform practices a computer-implemented method for trading securities in an electronic market comprises: matching by a computer system executing a first portion of instructions of a computer program, at least a portion of a received order for a security against a security interest in an order book that resides in a main memory of the computer system; accessing by the computer system, executing a remaining portion of the computer program, an execution log stored in a persistent, computer readable storage medium by: processing by the

computer system activities related to processing of securities other than matching of the received order to orders stored in the order book and with accessing to the order book in the main memory only through the first portion of the computer program product; and storing in an execution log file, a record of the portion of the received order matched to the security interest in the order book, with the execution log file stored on a persistent computer readable device of the computer system.

222. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

223. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

224. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

225. Using a further example, Figure 1 in the True Price Application indicates that IEX stores its order book in memory.

226. Using a further example, Figure 1 in the True Price Application suggests that in IEX's system, the order book can only be accessed by specific

portions of the code that run in the system (such as the matching engine 112), and is isolated from other portions of the code that run in the system.

227. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine 112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

228. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a persistent storage medium such as a hard drive.

229. Using a further example, the Message Retransmission Mechanism Application indicates that, after a match is made by the IEX matching engine, the information regarding the match is stored in the system's "master journal," which would be stored in a persistent storage medium such as a hard drive.

230. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application.

231. As another example, with regard to claim 21, upon information and belief, IEX's Accused Platform is, or includes, a computer program product

residing on a computer readable medium comprises instructions for trading securities in an electronic market to cause a computer to: match at least a portion of a received order for a security against a security interest in an order book that resides in main memory of a computer system; with instructions to match comprising instructions to: retrieve an order from the order book; match an incoming order to an order in the order book by a first portion of instructions of the computer program product that limit access to the order book to the first instructions; and update a status of the retrieved order in the order book to one of completely exhausted, executed, and open when a remainder of the order that has not been executed, remains in the order book; and access a log stored on a persistent storage device for processing activities related to processing of securities other than instructions to match the received order to orders stored in the order book by a remaining portion of instructions of the computer program product that access the order book in the main memory only through the first portion of the computer program product.

232. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

233. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

234. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

235. Using a further example, Figure 1 in the True Price Application indicates that IEX stores its order book in memory.

236. As a further example, IEX updates its order book to indicate whether orders are exhausted, executed, or open, as demonstrated by the example in the below excerpt from IEX's Rule Book:

> .03 Minimum Quantity Orders.
>
> Composite. When taking liquidity, minimum quantity size for a MQTY marked Composite is satisfied by one or more orders on the *IEX Book, provided the amount traded in aggregate will at least equal the order's effective minimum quantity. For a rest*ing MQTY marked Composite, if the specified minimum quantity of shares is not satisfied by a given contra side active order, the order will surrender its priority position only for the duration of processing said active order against the Order Book.
>
> For example, NBBO is $10.01 x $10.02.
>
> IEX receives three non-routable, non-displayed DAY sell orders: the first order, ORDER#1, for 200 shares with a limit of $10.02 is booked and ranked at the offer; the second order, ORDER#2, for 400 shares with a limit of $10.02, joins the offer at IEX and is ranked behind ORDER#1; the third order, ORDER#3, for 500 shares with a limit of $10.02, joins the offer at IEX and is ranked behind ORDER#2.
>
> Next, IEX receives a non-routable, non-displayed DAY buy MQTY for 7,500 shares marked Composite with a limit price of $10.02 and minimum quantity size of 1,000 shares, ORDER#4. Since the aggregate size of all three sell orders exceeds the minimum quantity size of ORDER#4, three discrete executions representing a cumulative 1,100 shares occur in one single atomic action, i.e. a single book processing action, in which ORDER#4 removes the resting sell interest. The first execution is for 200 shares at $10.02, which fully fills the oldest resting sell limit order on the offer, ORDER#1. The second execution is for 400 shares at $10.02, and fully fills the next oldest resting sell limit order on the offer, ORDER#2. The third execution is for 500 shares at $10.02, and fully fills the youngest resting sell limit order on the offer, ORDER#3. As a result of this event, ORDER#4 is decremented to a quantity of 6,400 shares from the original 7,500 shares and booked at the Midpoint Price.

237. Using a further example, Figure 1 in the True Price Application suggests that in IEX's system, the order book can only be accessed by specific

portions of the code that run in the system (such as the matching engine 112), and is isolated from other portions of the code that run in the system.

238. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine 112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

239. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a persistent storage device such as a hard drive.

240. Using a further example, the Message Retransmission Mechanism Application indicates that, after a match is made by the IEX matching engine, the information regarding the match is stored in the system's "master journal," which would be stored in a persistent storage device such as a hard drive.

241. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application.

242. Upon information and belief, IEX's infringement pursuant to 35 U.S.C. § 271(a) is ongoing.

243. Upon information and belief, IEX has induced infringement of at least the foregoing claims of the ’622 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, their consultants, software developers, engineers, customers, repair providers, and end users (such as primary market makers, competitive market makers, and broker-dealers) to make, use, sell, offer to sell, and/or import within the United States, an automated platform made in accordance with the ’622 Patent, including, but not limited to, the Accused Platform, by, among other things, providing access, instructions, and technical assistance relating to the Accused Platform on IEX websites. Upon information and belief, IEX’s inducement of infringement pursuant to 35 U.S.C. § 271(b) is ongoing.

244. Upon information and belief, IEX has committed the foregoing infringing activities without license from Nasdaq and with notice of the ’622 Patent.

245. IEX knew the ’622 Patent existed while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the ’622 Patent. Nasdaq’s damages should be trebled pursuant to 35 U.S.C. § 284 because of IEX’s willful infringement of the ’622 Patent.

246. The acts of infringement by IEX have been performed with the knowledge of the ’622 Patent and are willful, wanton and deliberate, thus

rendering this action "exceptional" within the meaning of 35 U.S.C. § 285 and entitling Nasdaq to its reasonable attorney's fees and litigation expenses.

247. The acts of infringement by IEX will continue unless enjoined by this Court.

248. Nasdaq has been and will continue to be irreparably harmed and damaged by IEX's acts of infringement of the '622 Patent and has no adequate remedy at law.

COUNT VI: INFRINGEMENT OF THE '362 PATENT

249. Plaintiffs incorporate the preceding paragraphs as if fully set forth herein.

250. As further described in the specification of the '362 Patent, the claims in this Patent generally relate to electronic trading system matching engine performance.

251. The technology described in this Patent involves, among other features, managing an order book that is stored in main memory, limiting how the order book is accessed in the main memory (*i.e.*, "order book isolation"), storing other data in media that are not subject to the same access limitation, and providing a means to query this other stored data.

252. As of the priority date of this Patent, such features, described more fully in the claims of this Patent, were not well-understood, routine, or conventional.

253. The "traditional file based approaches" commonly in use before this Patent's priority date were much less performant than the approaches described in this Patent.

254. The advantages conferred by the technology described in this Patent over prior conventional technologies include, but are not limited to, increased throughput, scalability, reliability, determinism, and transparency.

255. Upon information and belief, IEX has infringed at least claims 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, and 27 of the '362 Patent pursuant to 35 U.S.C. § 271(a) by making, using, offering to sell, selling, and/or importing within the United States, without authority, products or services practicing a computer-implemented method for distributing information in an electronic trading venue according to the invention, including, but not limited to, the Accused Platform.

256. As an example, with regard to claim 1, upon information and belief, IEX's Accused Platform is, or includes, a computer system comprising: a processor configured to receive electronic trading orders and operatively coupled to; a main non-transitory memory that holds an order book containing unexecuted

trading orders received by the processor, the main non-transitory memory holding the entire order book that stores unexecuted orders for at least one security trading on an electronic trading venue; and an executable computer program executed on the processor and residing in the main non-transitory memory, with execution of the computer program causing the processor to: match, by the processor, a received, new, trading order against the unexecuted trading orders pending in the order book, during matching, the processor accessing the order book for matching wherein other processes are restricted by said processor from accessing the order book; insert, in a log file that resides in a non-transitory storage medium, information representing an activity relating to a security interest stored in the order book that resides in the main non-transitory memory; and receive a user query relating to the security interest stored in the log file that resides in the non-transitory storage medium.

257. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

258. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

259. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

260. Using a further example, Figure 1 in the True Price Application indicates that IEX stores its order book in memory.

261. Using a further example, Figure 1 in the True Price Application suggests that in IEX's system, the order book can only be accessed by specific portions of the code that run in the system (such as the matching engine 112), and is isolated from other portions of the code that run in the system.

262. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine 112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

263. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a non-transitory storage medium such as a hard drive.

264. Using a further example, the Message Retransmission Mechanism Application indicates that, after a match is made by the IEX matching engine, the

information regarding the match is stored in the system's "master journal," which would be stored in a non-transitory storage medium such as a hard drive.

265. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application.

266. Using a further example, IEX offers an online API through which it receives, and responds to, users' queries for information regarding changes in the state of the order book and historical trading information, which would be stored in the "master journal."

267. As another example, with regard to claim 10, upon information and belief, IEX's Accused Platform practices a computer-implemented method for distributing information in an electronic trading venue comprising: matching, by a processor, incoming electronic trading orders against orders pending in an order book that resides in a main non-transitory memory of a computer system, the main non-transitory memory holding the entire order book that stores unexecuted orders for at least one security trading on the electronic trading venue, wherein during matching other processes are restricted by said processor from accessing the order book; inserting, by the computer system that includes the main non-transitory memory, a record into a log file that resides in a sequential non-transitory access storage medium, the record having information representing an activity relating to a security interest stored in the order book that resides in main memory; and

receiving, by the computer system, a user query relating to the security interest stored in the file that resides in the non-transitory access storage medium.

268. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

269. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

270. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

271. Using a further example, Figure 1 in the True Price Application indicates that IEX stores its order book in memory.

272. Using a further example, Figure 1 in the True Price Application suggests that in IEX's system, the order book can only be accessed by specific portions of the code that run in the system (such as the matching engine 112), and is isolated from other portions of the code that run in the system.

273. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine

112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

274. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a non-transitory access storage medium such as a hard drive.

275. Using a further example, the Message Retransmission Mechanism Application indicates that, after a match is made by the IEX matching engine, the information regarding the match is stored in the system's "master journal," which would be stored in a non-transitory access storage medium such as a hard drive.

276. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application.

277. Using a further example, IEX offers an online API through which it receives, and responds to, users' queries for information regarding changes in the state of the order book and historical trading information, which would be stored in the "master journal."

278. As another example, with regard to claim 19, IEX's Accused Platform is, or includes, a computer program product comprising computer executable instructions residing on a non-transitory computer readable medium for causing a computer to: match, by the computer, incoming electronic trading orders against

orders pending in an order book that resides in a main non-transitory memory of a computer system, the main non-transitory memory holding the entire order book that stores unexecuted orders for at least one security trading on an electronic trading venue, wherein during matching other processes are restricted by said processor from accessing the order book; insert a record in a log file that resides in a non-transitory storage medium the record having information representing an activity relating to a security interest stored in the order book that resides in main memory; and receive a user query relating to the security interest stored in the log file that resides in the storage medium.

279. To illustrate using an example, IEX's User Manual states that IEX offers an electronic "trading platform" that processes "incoming orders" from "Users."

280. Using a further example, IEX's User Manual states that "[t]he [IEX] Exchange is a fully automated electronic limit order book for orders to buy and sell . . . securities."

281. Using a further example, IEX's User Manual states that IEX's system has a "continuous, automatic matching function."

282. Using a further example, Figure 1 in the True Price Application indicates that IEX stores its order book in memory.

283. Using a further example, Figure 1 in the True Price Application suggests that in IEX's system, the order book can only be accessed by specific portions of the code that run in the system (such as the matching engine 112), and is isolated from other portions of the code that run in the system.

284. Using a further example, the specification of the True Price Application states that the "order delaying module 114 [delays] the transaction requests received by the communication interface 108 before they are forwarded to the matching engine 112 for matching," which suggests that the matching engine 112 can access the order book while the order book is isolated from other modules (such as the delaying module 114).

285. Using a further example, as detailed in IEX's FIX Specification, IEX provides Execution Reports to all market participants; in order to generate such messages, IEX must save the matched order in a log file, which would be stored in a storage medium such as a hard drive.

286. Using a further example, the Message Retransmission Mechanism Application indicates that, after a match is made by the IEX matching engine, the information regarding the match is stored in the system's "master journal," which would reside in a storage medium such as a hard drive.

287. Using a further example, this "master journal" storage feature is also depicted in Figure 5A of IEX's Speed Bump Application.

288. Using a further example, IEX offers an online API through which it receives, and responds to, users' queries for information regarding changes in the state of the order book and historical trading information, which would be stored in the "master journal."

289. Upon information and belief, IEX's infringement pursuant to 35 U.S.C. § 271(a) is ongoing.

290. Upon information and belief, IEX has induced infringement of at least the foregoing claims of the '362 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, their consultants, software developers, engineers, customers, repair providers, and end users (such as primary market makers, competitive market makers, and broker-dealers) to make, use, sell, offer to sell, and/or import within the United States, an automated platform made in accordance with the '362 Patent, including, but not limited to, the Accused Platform, by, among other things, providing access, instructions, and technical assistance relating to the Accused Platform on IEX websites. Upon information and belief, IEX's inducement of infringement pursuant to 35 U.S.C. § 271(b) is ongoing.

291. Upon information and belief, IEX has committed the foregoing infringing activities without license from Nasdaq and with notice of the '362 Patent.

292. IEX knew the ’362 Patent existed while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the ’362 Patent. Nasdaq’s damages should be trebled pursuant to 35 U.S.C. § 284 because of IEX’s willful infringement of the ’362 Patent.

293. The acts of infringement by IEX have been performed with the knowledge of the ’362 Patent and are willful, wanton and deliberate, thus rendering this action “exceptional” within the meaning of 35 U.S.C. § 285 and entitling Nasdaq to its reasonable attorney’s fees and litigation expenses.

294. The acts of infringement by IEX will continue unless enjoined by this Court.

295. Nasdaq has been and will continue to be irreparably harmed and damaged by IEX’s acts of infringement of the ’362 Patent and has no adequate remedy at law.

COUNT VII: INFRINGEMENT OF THE ’609 PATENT

296. Plaintiffs incorporate the preceding paragraphs as if fully set forth herein.

297. As further described in the specification of the ’609 Patent, the claims in this Patent generally relate to the identification and extraction of changes in data sets, and subsequent distribution of the resulting “update data sets” to client systems.

298. As of the priority date of this Patent, it was not well-understood, routine, or conventional to generate and disseminate update data sets using the method described more fully in the claims of this Patent.

299. The advantages conferred by this technology over prior conventional technologies include, but are not limited to, enhanced computational efficiency in the code involved in the generation of the data sets and the faster and more bandwidth-efficient distribution of data sets over the network.

300. Upon information and belief, IEX has infringed at least claims 1, 2, 3, 4, 10, and 12 of the ’609 Patent pursuant to 35 U.S.C. § 271(a) by making, using, offering to sell, selling, and/or importing within the United States, without authority, products or services practicing a method for generating an update set according to the invention, including, but not limited to, the Accused Platform.

301. As an example, with regard to claim 1, upon information and belief, IEX’s Accused Platform is, or includes, a computer system for generating an update data set to be sent to remote terminals, the update data set comprising operators describing differences between a first data set comprising sorted data elements and a second data set comprising sorted data elements, the computer system comprising: a memory comprising the first and the second data set, a comparator connectable to the memory for sequentially comparing the data elements in the second data set with the data elements in the first data set, the result

of a first comparison controls which data element in the first data set and which data element in the second data set that will be compared in a second comparison updating a parameter in the memory after each second comparison, and initiating a selector upon detection of a data element in the second data set being identical to a data element in the first data set, the selector being connectable to the memory and to the comparator, the selector being adapted to determine operators based on the parameter stored in the memory, and storing the determined operators in the memory, wherein the computer system is configured to generate an update data set, including the determined operators describing differences between the second data set and the first data set, to be sent to the remote terminals.

302. To illustrate using an example, IEX disseminates a data set to market participants known as DEEP, which, according to IEX's DEEP Specification, consists of "aggregated size of resting displayed orders [on the order book] at a price and side."

303. Using a further example, IEX's DEEP Specification indicates that IEX's DEEP data sets provide "real-time depth of book quotations and last sale information."

304. Using a further example, IEX sends updated DEEP data sets numerous times daily to participants, in the form of changes as shown in the below excerpt from the DEEP Specification:

TRADING MESSAGE FORMATS

Price Level Update Message – 8 (0x38), 5 (0x35)

DEEP broadcasts a real-time Price Level Update Message each time a displayed price level on IEX is updated during the trading day. When a price level is removed, IEX will disseminate a size of zero (i.e., 0x0) for the level.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'8' (0x38) – Price Level Update on the Buy Side '5' (0x35) – Price Level Update on the Sell Side
Event Flags	1	1	Byte	Identifies event processing by the System
Timestamp	2	8	Timestamp	Time stamp of the price level update
Symbol	10	8	String	Security identifier
Size	18	4	Integer	Aggregate quoted size
Price	22	8	Price	Price level to add/update in the IEX Order Book

Total Message Data length is 30 bytes. See Appendix B for the bitwise representation.

305. Using a further example, when IEX receives a new order, it determines how its order book changes; the pre- and post-change IEX order books correspond to the first and second data sets described in the Patent claim.

306. Using a further example, IEX performs a comparison of the two order book versions to identify the parameter changes and operators to be disseminated, as demonstrated in the below example from the DEEP Specification:

1. Order Book for symbol ZIEXT
   - Sell 100 @ 25.30
   - Sell 100 @ 25.20

   - Sell 100 @ 25.10
   - Buy 100 @ 25.00
   - Buy 100 @ 24.90

   IEX BBO: Buy 100 @ 25.00 x Sell 100 @ 25.10
2. Price Level Update on the Sell Side received: Event Flags: 0x0, Price: 25.10, Shares: 0
   - Sell 100 @ 25.30
   - Sell 100 @ 25.20
   - Buy 100 @ 25.00
   - Buy 100 @ 24.90

   IEX BBO: Buy 100 @ 25.00 x Sell 100 @ 25.10 (Reason: ZIEXT Order Book is in transition)
3. Price Level Update on the Sell Side received: Event Flags: 0x1, Price: 25.20, Shares: 0
   - Sell 100 @ 25.30
   - Buy 100 @ 25.00
   - Buy 100 @ 24.90

   IEX BBO: Buy 100 @ 25.00 x Sell 100 @ 25.30 (Reason: ZIEXT Order Book transition complete)

307. Using a further example, IEX determines the final set of changes and operators to be disseminated, the end of which set is identified through an "Event Flag," at the point when the data set construction algorithm senses no further changes in the order book, *i.e.*, finds identical data elements in the comparison.

308. As another example, with regard to claim 12, upon information and belief, IEX's Accused Platform practices a method for generating an update data set to be sent to remote terminals, the update data set comprising operators describing differences between a first data set comprising sorted data elements stored in a memory and a second data set comprising sorted data elements in the memory, the method comprising the steps of: sequentially comparing the data elements in the first data set with the data elements in the second data set, the result of a first comparison controls which data element in the first data set and which data element in the second data set that will be compared in a second comparison, after each comparison a change parameter is updated in the memory, upon detection of a data element in the second data set being identical to a data element in the first data set, initiating a selection process determining operators based on the change parameter stored in the memory, and storing the determined operators in the memory, generating an update data set, including the determined operators describing differences between the first data set and the second data set, to be sent to remote terminals.

309. To illustrate using an example, IEX disseminates a data set to market participants known as DEEP, which, according to IEX's DEEP Specification, consists of "aggregated size of resting displayed orders [on the order book] at a price and side."

310. Using a further example, IEX's DEEP Specification indicates that the DEEP data sets provide "real-time depth of book quotations and last sale information."

311. Using a further example, IEX sends updated DEEP data sets numerous times daily to participants, in the form of changes as shown in the DEEP Specification.

312. Using a further example, when IEX receives a new order, it determines how its order book changes; the pre- and post-change order books correspond to the first and second data sets described in the Patent claim.

313. Using a further example, IEX performs a comparison of the two order book versions to identify the parameter changes and operators to be disseminated, as in the DEEP Specification.

314. Using a further example, IEX determines the final set of changes and operators to be disseminated, the end of which set is identified through an "Event Flag," at the point when the data set construction algorithm senses no further changes in the order book, *i.e.*, finds identical data elements in the comparison.

315. Upon information and belief, IEX's infringement pursuant to 35 U.S.C. § 271(a) is ongoing.

316. Upon information and belief, IEX has induced infringement of at least the foregoing claims of the '609 Patent pursuant to 35 U.S.C. § 271(b), by actively and knowingly inducing, directing, causing, and encouraging others, including, but not limited to, their consultants, software developers, engineers, customers, repair providers, and end users (such as primary market makers, competitive market makers, and broker-dealers) to make, use, sell, offer to sell, and/or import within the United States, an automated platform made in accordance with the '609 Patent including, but not limited to, the Accused Platform, by, among other things, providing access, instructions, and technical assistance relating to the Accused Platform on IEX websites. Upon information and belief, IEX's inducement of infringement pursuant to 35 U.S.C. § 271(b) is ongoing.

317. Upon information and belief, IEX has committed the foregoing infringing activities without license from Nasdaq Technology and with notice of the '609 Patent.

318. IEX knew the '609 Patent existed while committing the foregoing infringing acts, thereby willfully, wantonly, and deliberately infringing the '609 Patent. Nasdaq Technology's damages should be trebled pursuant to 35 U.S.C. § 284 because of IEX's willful infringement of the '609 Patent.

319. The acts of infringement by IEX have been performed with the knowledge of the ’609 Patent and are willful, wanton and deliberate, thus rendering this action “exceptional” within the meaning of 35 U.S.C. § 285 and entitling Nasdaq Technology to its reasonable attorney’s fees and litigation expenses.

320. The acts of infringement by IEX will continue unless enjoined by this Court.

321. Nasdaq Technology has been and will continue to be irreparably harmed and damaged by IEX’s acts of infringement of the ’609 Patent and has no adequate remedy at law.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray for judgment in their favor against IEX granting Plaintiffs the following relief:

A. Entry of judgment in favor of Plaintiffs against IEX on all counts;

B. Entry of judgment that IEX has infringed the Patents-in-Suit;

C. Entry of judgment that IEX’s infringement of the Patents-in-Suit has been willful;

D. An order permanently enjoining IEX, together with their officers, directors, agents, servants, employees, and attorneys, and upon those persons in active concert or participation with them, from infringing the Patents-in-Suit;

E. An award of compensatory damages adequate to compensate Plaintiffs for IEX's infringement of the Patents-in-Suit, but in no event less than a reasonable royalty for the use made of the invention by IEX, together with interest and costs as fixed by the Court and trebled for willful infringement as provided by 35 U.S.C. § 284;

F. Plaintiffs' reasonable fees for expert witnesses and attorneys, as provided by 35 U.S.C. § 285, as well as Plaintiffs' costs;

G. Pre-judgment and post-judgment interest on Plaintiffs' award; and

H. All such other and further relief as the Court deems just or equitable.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38 of the Fed. R. Civ. P., Plaintiffs hereby demand trial by jury in this action of all claims so triable.

Dated: March 1, 2018

Respectfully submitted,

By: *s/ Michael Critchley, Sr.*

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