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SIFMA Electronic Bond Trading Report: US Corporate & Municipal Securities

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Executive Summary

This report provides an overview of select electronic bond platforms in US Corporate and Municipal securities markets¹

<p>Relevance to Stakeholders</p>	<ul style="list-style-type: none"> • Regulatory and market forces are driving changes in the fixed income market structure. • The focus on electronic trading and digitization is growing due to the potential benefits of transparency and liquidity. • There is limited information available for stakeholders to gain a robust understanding of the incumbent and new platforms' functionality and the evolving price discovery and execution protocols.
<p>Objectives and Approach</p>	<ul style="list-style-type: none"> • This report provides profiles of electronic bond trading platforms and includes information on the target markets, trading protocols, technology interfaces, planned enhancements and related capabilities. It intends to give stakeholders a greater understanding of the changing electronic trading marketplace. • The information provided herein was generated by interviewing management from 19 electronic bond trading platforms. The information has not been independently verified by SIFMA and is limited to the information provided by the platforms.
<p>Initial Observations</p>	<ul style="list-style-type: none"> • There has been a significant increase in the number electronic trading venues competing in the growing electronic trading market for US Corporate and Municipal securities. 7 of the platforms interviewed have entered the market in the last 2 years, and 4 more plan to launch in 2016. The increase in platform competition and innovation is concentrated in the corporate bond market. • Established trading protocols are being enhanced and several new protocols are emerging to promote price discovery, including order books with live and executable orders, session based trading, and platform determined midpoint pricing. Platforms have been structured, and their services delivered, in a variety of ways to address the differing demands of participants and to garner greater participation. • The developments in the electronic trading marketplace for Corporate and Municipal securities reflect a fixed income market that is adapting and evolving.

1. The survey's primary focus was US Corporate and Municipal markets, however it does include one platform that serves other markets.

Regulatory and industry forces are driving changes in market structure and increasing the focus on electronic trading...

Regulatory Drivers

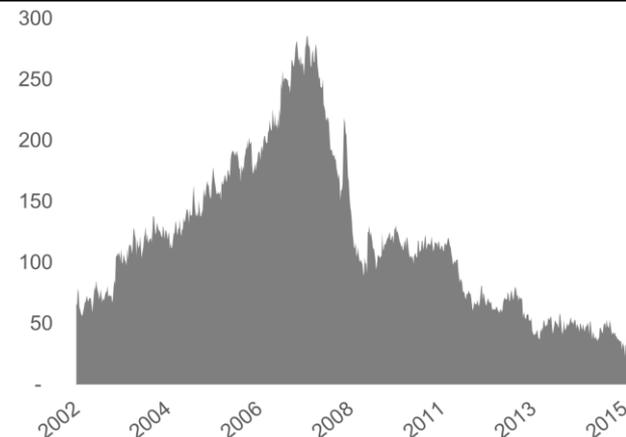
- Since the financial crisis, regulatory changes have impacted Dealers' market making capacity:
 - Higher capital charges and liquidity requirements have increased the cost of balance sheet usage, and the commensurate need for greater capital efficiency has constrained market making capacity.
 - The Volcker Rule has decreased proprietary trading and also contributed to lower Dealer inventories.
- There is increased regulatory attention on best execution requirements and the need for greater pre-trade transparency.

Industry Drivers

- The overall size of the bond market has increased substantially, but Dealer inventory has not kept pace. For example, the Corporate Bond market has nearly doubled since the financial crisis. However, the size of the Municipal Bond market has stagnated since the financial crisis.
- Due to both regulatory changes and market conditions, Dealers have rationalized the breadth of their business, and some have refocused on core products and clients, resulting in reduced market making activity in certain markets.
- Increased discussion and concern about market liquidity has accentuated the desire for connectivity and increased the focus on liquidity planning.

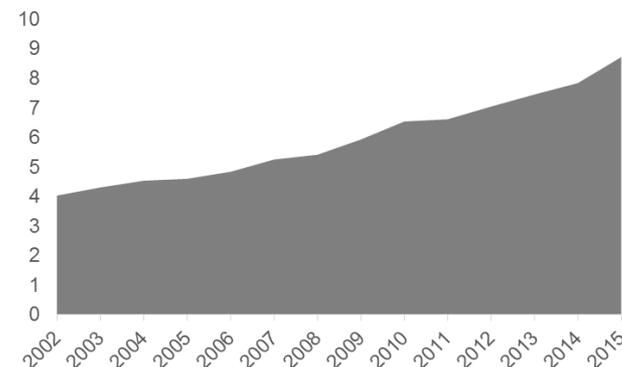
US Corporate Bond Dealer Inventory

(Market Value in Billions of \$)¹



Outstanding US Corporate Debt

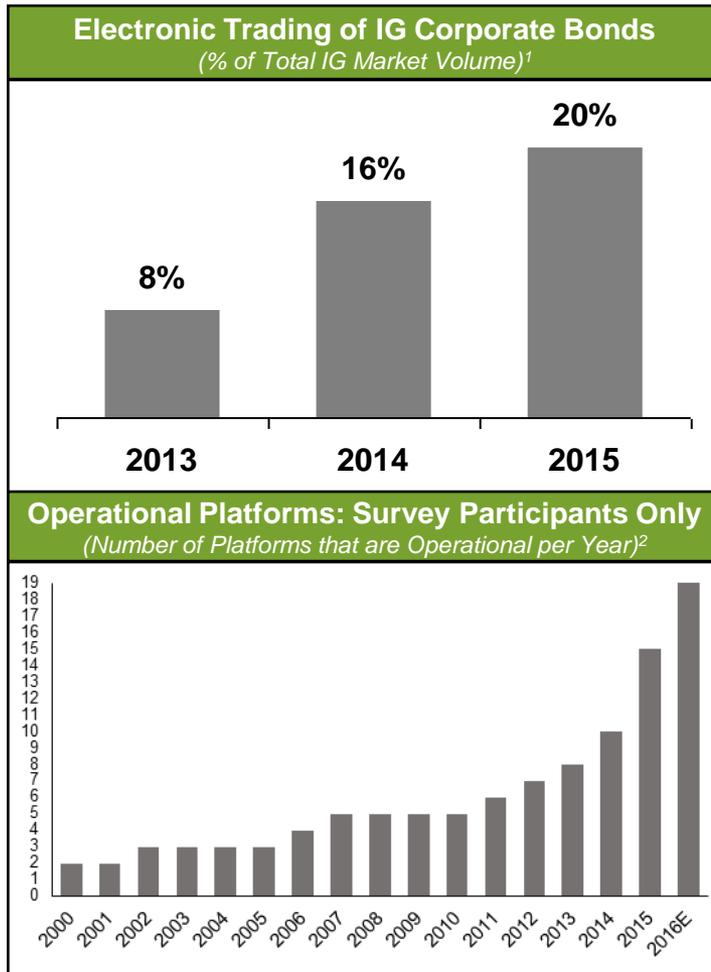
(Notional in Trillions)²



1. Citation: Federal Reserve Bank of New York, Primary Dealer Survey

2. Citation: SIFMA research

...these forces are the key contributors to the growth and proliferation of electronic trading and electronic platforms



- Key Market Trends/Developments**
- Market participants have expressed greater interest in electronic trading solutions as a means to broaden trade execution capabilities and help reduce market frictions:
 - Electronic trading of IG bonds in the US is estimated to be ~20% of the total IG trading volume, representing a ~150% increase from 2013.
 - The number of platforms has grown significantly within the same time frame in response to the increasing demand.
 - Many new entrants are in early stages of development and volumes appear to remain relatively concentrated among incumbents.
 - Platforms have increased investment in leveraging technology and data such as:
 - Standardization of communication protocols to reduce integration costs and to connect efficiently to participants.
 - Pre and post pricing data aggregation in order to introduce sophisticated pricing tools.
 - Increased connectivity across technology platforms, trading venues, and directly with clients to enhance access to market liquidity.

1. Citation: Greenwich Associates, "The Continuing Corporate Bond Evolution", Q4 2015. Please note that Greenwich Associates interviewed 1,063 US Institutional Investor active in Fixed Income between February and April 2015 to gather the information on Corporate Bond electronic trading

2. Citation: Platform interviews. Based on the year each platform was launched and only includes report participants and their US Corporates and Municipal security businesses, 2016 numbers are estimates

This report profiles electronic platforms, both established and early-stage, to understand the changing industry landscape

Report Objectives

- Given the evolving electronic marketplace and the increased focus on best execution, transparency and liquidity sourcing, this report aims to help educate market participants about the existing and emerging trade execution models.
- A more informed marketplace will permit more constructive discussions on the fixed income market structure of today and the future.

Report Approach and Methodology

- This report is based on information compiled from interviews with management from 19 electronic platforms. The interviews and the report were designed to:
 - Generate a fact-based profile of each platform that describes key capabilities, and details the relevant trading protocols employed.
 - Consolidate information across key attributes such as price transparency, counterparty visibility, fees, and technology.
 - Provide a consistent framework to describe 19 electronic trading platforms and their 42 electronic trading protocols.
- Several platforms are not represented in this report because they only offer a hybrid model (combination of voice and electronic communication together) or they chose not to participate.
- Participating platforms reviewed and approved their profiles in the report however SIFMA has not independently verified the accuracy or completeness of the information provided.

Platforms Interviewed

(Listed Alphabetically)

- | | |
|------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1. Bloomberg | 11. liquidnet |
| 2. CLARITY
<small>BID-ASK ALTERNATIVE TRADING SYSTEM</small> | 12. MarketAxess |
| 3. codestreet | 13. MTS |
| 4. DELPHX | 14. NYSE |
| 5. electronifie | 15. OPEN BOND X |
| 6. GFI | 16. TMC Bonds |
| 7. ICAP | 17. Tradeweb |
| 8. ITG | 18. TradingScreen
<small>SIMPLIFYING GLOBAL MARKETS</small> |
| 9. KCG BondPoint | 19. TRUMID |
| 10. LIQUIDITY
<small>Liquidity Finance</small> | |

Platforms are enhancing existing protocols and introducing innovative new protocols

Trading Protocols	
Session Trading	Matching Session: Real-Time Matching Facilitates trading of a limited set of CUSIPs over a condensed period of time. Orders are live and executable upon submission and order matching occurs throughout the session, often at a predetermined price set by the platform.
	Matching Session: End of Session Matching Facilitates trading of a limited set of CUSIPs over a condensed period of time. Submitted orders can be modified by participants prior to the end of the session, at which point they are matched. Matching is based on prioritization across multiple dimensions such as price, size, and time.
E-RFQ / Auction	Electronic Request for Quote ("E-RFQ") Transition of the traditional RFQs (voice trading) onto an electronic venue, where participants typically broadcast requests to all, or a subset, of the participants on the platform. Responders submit quotes for the initiators consideration, and on some platforms initiators have the option to negotiate.
	Dutch Auction Facilitates a bid/offer process to buy or sell securities within a set period of time. Bidders have the ability to modify bids prior to the end of the auction, and have visibility of all competing bids. At the auction deadline, the price is lowered until there are enough bids at or above the price to clear the full auction size and then all the bonds are sold at that clearing price.
Additional Trading Protocols	Lit Order Book/ Quote Streaming/ Click to Trade ("LOB/ QS/ CtT")¹ Facilitates matching of buyers and sellers by displaying a variety of order information. This includes, but is not limited to, quote streaming and order books that display some or all participant orders. Information displayed is typically a combination of price, size, partial size, etc. Some protocols give participants the ability to lift orders directly from their screen while others have last looks.
	Hidden Order Book ("HOB") Facilitates trading that is fully anonymous pre-trade, with limited visibility of the orders/IOIs. These protocols typically include a displayed list of securities for which there is outstanding interest. The display does not include details such as size or direction. These protocols aim to minimize participants' market impact. Participants typically submit orders/IOIs of the full size of the desired trade.
	Dark Pool Facilitates trading that is fully anonymous pre-trade, with no visibility of the orders/IOIs. These protocols aim to minimize participants' market impact. Participants typically submit orders/IOIs of the full size of the desired trade. Some Dark Pools involve bilateral negotiation between matched counterparties.

1. Terminology usage varies by each participant. Please review profile for detailed protocol explanation

Interviews have revealed trends and themes in the marketplace... (1/2)

Platforms are enhancing existing trading protocols and introducing innovative new protocols in order to...

- **Increase Market Participation:** New platforms offer All to All trading with intermediation on a riskless principal basis through a designated dealer partner or by permitting Buy-Side participation with sponsored intermediation by a Dealer chosen by the participant. 26 protocols, on 14 platforms, offer All to All trading.
- **Identify Liquidity Opportunities:** Platforms host matching sessions (timed trading sessions with pre-selected securities) to concentrate liquidity. Platforms select which CUSIPs to include in the sessions based on market events and/or direct input from participants.
- **Enhance Price Discovery:** Various price discovery aids and mechanisms are being deployed by the platforms to hasten price discovery. Protocols include streaming prices from dealers, and platform provided midpoint pricing for matching sessions. In addition, platforms are increasingly providing access to historical pre- and post-trade data sources, best execution analysis, and transaction cost analysis.

Platforms are increasingly targeting larger sized trades and are shifting to firm and executable orders.

- **Several platforms have or are launching protocols targeted at round and block sized trading:** Historically, platforms have proven to be more successful in trading smaller order sizes, but are now attempting to facilitate larger trades. Some platforms leverage prices from smaller trades to assist with price discovery for subsequent larger trades. However, Dealers are still viewed as the key source of liquidity when immediacy for large trades is desired.
- **17 platforms support firm and executable orders:** However, the firm and executable order type appear to still only account for a limited portion of the total volume. Of the 17 platforms, 5 platforms also provide the option to trade with a last look in addition to firm and executable orders.

Platforms are providing various methods to protect anonymity and prevent information leakage.

- **Dealer Sponsored Access:** Some platforms require Buy-Side participants to intermediate trades through a sponsoring Dealer. This allows trading on a disclosed basis between the Dealers on the platform, while Buy-Side participants remain anonymous.
- **Preventing information leakage:** Some platforms protect participants interest/order information by matching two counterparties and disclosing initial negotiation prices only when each counterparty's price is within a defined range or near the platform's calculated price.
- **Counterparty evaluation tools:** 4 platforms are helping participants evaluate counterparties anonymously, by implementing color-coding and/or rating mechanisms, related to participants' historical execution rate or other similar metrics.

Interviews have revealed trends and themes in the marketplace... (2/2)

Platforms are attempting to ease connectivity and reduce frictions with participants internal systems and processes

- **Interfaces:** 16 of the platforms interviewed support FIX messaging, and 11 provide API connectivity.
- **Supporting multi-security trading:** 11 platforms offer bid-list processing capabilities and other upload functionalities.
- **Vendor compatibility:** Platforms are developing compatibilities with established vendors and service providers for trade processing, trade reporting, risk management, and clearing.
- However, technology costs, the high number of platforms and implementation time still presents obstacles.

Platforms are organized in different legal and regulatory structures

- **16 of the platforms interviewed are registered ATs and Broker-Dealers:** However, 3 platforms are not registered as such, and instead assist their participants to find a mutual trading interest, and trades are executed off the platform.

Platforms are participating in cross-asset class/cross-border pollination...

- **Cross-asset:** Many platforms are leveraging technology and established relationships with existing clients from other asset-classes to expand into new asset classes. 13 platforms trade in other asset-classes beyond Corporates and Municipals.
- **Cross-border:** Electronic execution has greater prevalence within European markets, and 5 platforms are cross-leveraging functionalities between European and US markets. In addition, 9 platforms support trading of International Fixed Income securities.

Platform innovation is primarily occurring in the Corporate Bond market, while the Municipal market faces headwinds...

- **Municipal markets likely to shift more gradually:** The complexity of the Municipal Bond market with the high direct retail participation presents a unique obstacle, but the investment in technology in corporate markets should benefit the municipal markets over time.
- **More new platforms support corporate securities than municipal securities:** 13 platforms interviewed have entered the Corporate Bond market space within the last two years and 2 platforms have entered the Municipal Bond market space within the last two years. This includes 1 platform that has entered both markets.
- **Traditional Request for Quote (RFQ) appears to still dominate the electronic Municipal Bond market:** Hybrid models are still common; whereas, the electronic execution market for Corporates Bonds has become readily available.

...and highlight the significant innovation in the marketplace and variance in new trading protocols

Electronic Trading Market Overview

#	Parent Company	Protocol	Protocol Tenure										Securities Traded				Typical Target Trade Size			Counterparty Interaction			Order Visibility			Order Type		Counterparty Visibility		Trade Counterparty		Fee Structure		Other	
			Not Yet Launched	Operational <2 Years	Operational 2-4 Years	US Corporate Bonds	Municipal Bonds	Other Securities	Block Trades	Round Lots (< \$5mm)	Odd Lots (> \$5mm)	Micro Lots (\$100k to \$1mm)	All to All	Dealer to Buy Side (D2B)	Dealer to Dealer (D2D)	D2B and D2D	No Information	Security Interest Deployed	Only Best Bid Offer	Permissioned/Limited View	Live & Executable	Last Look	Fully Anonymous	Disclosed Post-Trade	Fully Disclosed	Platform Intermediated	Single 3rd Party Dealer	Dealer Sponsored	Direct	Subscription Fees	Dual-Sided Trans. Fees	Single-Sided Trans. Fees	Other Fees	Suggested Price	Bilateral Negotiation
1	Arbor Research - Clarity BidRate	ATS	X			X	X	X	X						X				X	X	X		X											X	
2	Arbor Research - Clarity BidRate	ATS	X			X	X	X	X										X	X	X		X											X	
3	Bloomberg - Bond Cross (Europe)	Dark Pool		X			X	X	X	X									X	X	X			X									X	X	
4	Bloomberg - Bond Cross (Americas)	Dark Pool		X			X	X	X	X									X	X	X			X									X	X	X
5	Bloomberg - ALLQ	E-RFQ			X		X	X	X	X									X	X	X			X									X	X	X
6	Bloomberg - BOLT	E-RFQ			X		X	X	X	X									X	X	X			X									X	X	X
7	Bloomberg - IMGR, QMGR, & ALLQ	Click to Trade		X			X	X	X	X									X	X	X			X									X	X	X
8	CodeStreet - Codestreet Dealer Pool	Dark Pool	X				X	X	X						X		X			X	X			X								X	X	X	X
9	CodeStreet - Codestreet Dealer Pool	Matching Session - RT	X				X	X							X		X			X	X			X								X	X	X	X
10	DelphX	E-RFQ	X				X	X	X	X									X	X	X			X								X	X	X	X
11	DelphX	Auction	X				X	X	X	X									X	X	X			X								X	X	X	X
12	DelphX	LOB/QS	X				X	X	X	X									X	X	X			X								X	X	X	X
13	Electronifie	Hidden Order Book		X				X	X							X			X	X			X											X	
14	Electronifie	LOB/QS/QT		X				X	X	X									X	X	X			X										X	
15	Electronifie	Matching Session - ES		X				X	X							X			X	X			X											X	
16	GFI Group - GFI	Matching Session - RT			X		X	X	X					X					X	X	X			X										X	
17	GFI Group - Latium	Matching Session - RT			X		X	X	X					X					X	X	X			X										X	
18	GFI Group - Latium	E-RFQ		X			X	X						X					X	X	X			X										X	
19	ICAP - I-SAM	Matching Session - RT		X				X							X				X	X			X											X	
20	ITG - POSIT FI	Dark Pool		X			X	X	X						X				X	X	X			X									X	X	
21	ITG - POSIT FI	Matching Session - ES		X			X	X	X										X	X	X			X										X	
22	KCG - KCG BondPoint	LOB/QS/CT			X		X	X	X										X	X	X	X		X										X	
23	KCG - KCG BondPoint	E-RFQ			X		X	X	X										X	X	X	X		X										X	
24	Liquidnet - Liquidnet FDP	Dark Pool		X			X	X	X						X		X		X	X	X			X									X		X
25	Liquidity Finance - Liquidity Flow	LOB/QT		X			X	X								X			X	X			X											X	
26	Liquidity Finance - Liquidity Flow	Matching Session - RT		X			X	X								X			X	X			X											X	
27	MarketAxess - Axes	LOB/QS		X			X	X	X	X									X	X	X	X		X									X	X	X
28	MarketAxess	E-RFQ		X			X	X	X	X									X	X	X	X		X									X	X	X
29	MTS - MTS BondsPro	LOB/QS/CT		X			X	X	X										X	X	X	X		X										X	
30	NYSE - NYSE Bonds	Lit Order Book		X			X	X	X					X					X	X	X	X		X										X	
31	OpenBondX	E-RFQ		X				X	X										X	X	X			X									X		
32	TMC Bonds	LOB/QS/CT		X			X	X	X	X									X	X	X			X										X	
33	TMC Bonds	E-RFQ		X			X	X	X	X									X	X	X			X										X	
34	Tradeweb - Tradeweb Direct	Click to Trade		X			X	X	X										X	X	X	X		X										X	
35	Tradeweb - Tradeweb Direct	E-RFQ		X			X	X	X										X	X	X	X		X										X	
36	Tradeweb - Tradeweb (Institutional)	Click to Trade		X			X	X	X										X	X	X	X		X										X	
37	Tradeweb - Tradeweb (Institutional)	E-RFQ		X			X	X	X										X	X	X	X		X										X	
38	TradingScreen - TradeCross	Hidden Order Book		X			X	X											X	X	X	X		X										X	
39	TradingScreen	E-RFQ		X			X	X											X	X	X	X		X										X	
40	TruMid - TruMid Phase 1	Matching Session - ES		X			X	X											X	X	X			X										X	
41	TruMid - TruMid Phase 2	Matching Session - RT		X			X	X											X	X	X			X										X	
42	TruMid - TruMid Phase 3	Matching Session - ES		X			X	X											X	X	X			X										X	

Key: X indicates the characteristic is applicable to the trading protocol

Citation: Platform interviews

Electronic trading market overview table: Sorted by protocol type

Electronic Trading Market Overview			Protocol Tenure	Securities Traded	Typical Target Trade Size	Counterparty Interaction	Order Visibility	Order Type	Counterparty Visibility	Trade Counterparty	Fee Structure	Other																									
#	Parent Company	Protocol	Not Yet Launched	Operational <2 Years	Operational 2+ Years	US Corporate Bonds	Municipal Bonds	Other Securities	Block Trades (> \$5mm)	Round Lots (\$1-5mm)	Odd Lots (\$100k to \$1mm)	All to All	Dealer to Buy-Side (D2B)	Dealer to Dealer (D2D)	D2B and D2D	No Information	Security Interest Displayed	Only Best Bid/Offer	Permissions/Limited View	Full Depth of Book	Live & Executable	Last Look	Fully Anonymous	Disclosed Post-Trade	Fully Disclosed	Platform Intermediated	Single 3rd Party Dealer	Dealer Sponsored	Direct	Subscription Fees	Dual-Sided Trans. Fees	Single-Sided Trans. Fees	Other Fees	Suggested Price	Bilateral Negotiation		
1	Electronife	Matching Session - ES	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
2	ITG - POSIT FI	Matching Session - ES	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3	TruMid - TruMid Phase 1	Matching Session - ES	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
4	TruMid - TruMid Phase 3	Matching Session - ES	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5	CodeStreet - Codestreet Dealer Pool	Matching Session - RT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6	GFI Group - GFI	Matching Session - RT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
7	GFI Group - Latium	Matching Session - RT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	ICAP - I-SAM	Matching Session - RT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
9	Liquidity Finance - Liquidity Flow	Matching Session - RT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10	TruMid - TruMid Phase 2	Matching Session - RT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
11	Bloomberg - ALLQ	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12	Bloomberg - BOLT	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
13	DelphX	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14	GFI Group - Latium	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
15	KCG - KCG BondPoint	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	MarketAxess	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	OpenBondX	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	TMC Bonds	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
19	Tradeweb - Tradeweb (Institutional)	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	Tradeweb - Tradeweb Direct	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21	TradingScreen	E-RFQ	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22	Arbor Research - Clarity BidRate ATS	Auction	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	DelphX	Auction	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	Arbor Research - Clarity BidRate ATS	Click to Trade	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
25	Bloomberg - IMGR, QMGR, & ALLQ	Click to Trade	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	Tradeweb - Tradeweb (Institutional)	Click to Trade	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	Tradeweb - Tradeweb Direct	Click to Trade	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28	NYSE - NYSE Bonds	Lit Order Book	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
29	Liquidity Finance - Liquidity Flow	LOB/QT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30	DelphX	LOB/QS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
31	MarketAxess - Axes	LOB/QS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
32	Electronife	LOB/QS/QT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
33	KCG - KCG BondPoint	LOB/QS/QT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34	MTS - MTS BondsPro	LOB/QS/QT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
35	TMC Bonds	LOB/QS/QT	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36	Electronife	Hidden Order Book	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
37	TradingScreen - TradeCross	Hidden Order Book	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
38	Bloomberg - Bond Cross (Americas)	Dark Pool	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
39	Bloomberg - Bond Cross (Europe)	Dark Pool	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
40	CodeStreet - Codestreet Dealer Pool	Dark Pool	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
41	ITG - POSIT FI	Dark Pool	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
42	Liquidnet - Liquidnet FIDP	Dark Pool	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Key: X indicates the characteristic is applicable to the trading protocol

Citation: Platform interviews

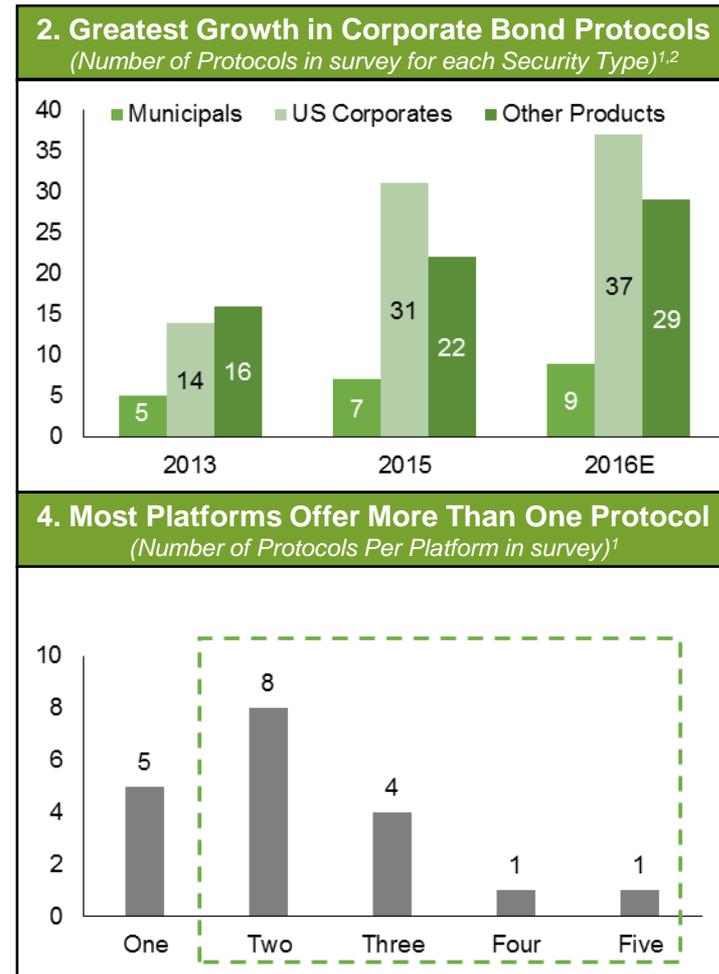
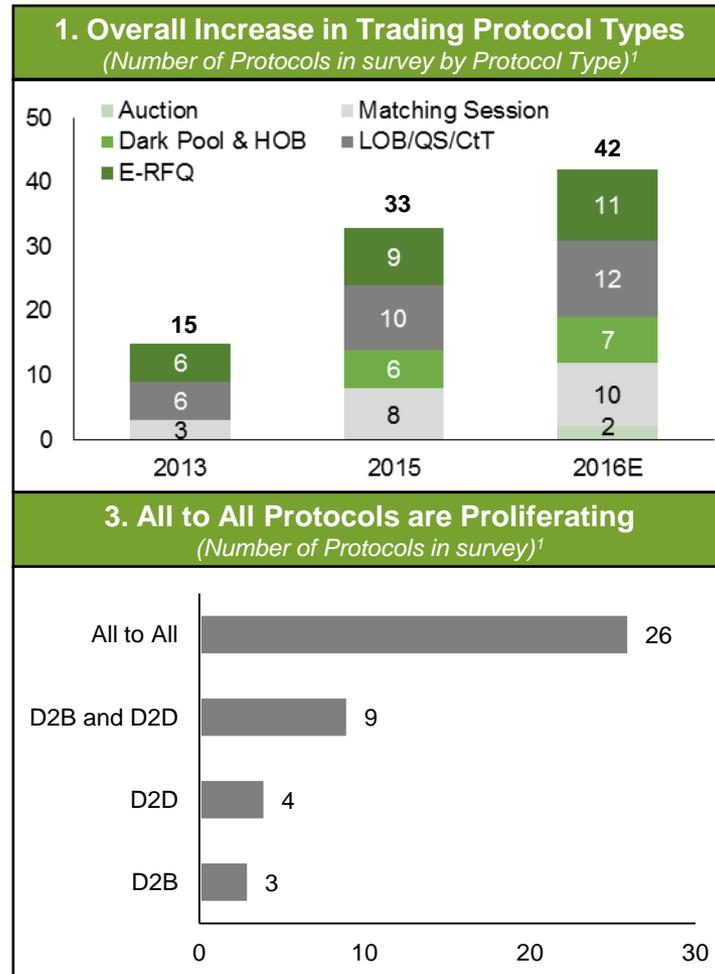
Electronic trading market overview table annotation

Description and explanation of table categories and fields

- **Protocol:** Platform's methodology to facilitate trading. Platforms may have additional protocols not considered in-scope of this report
 - Abbreviation: RT – Real-Time Matching Session
 - Abbreviation: LOB – Lit Order Book
 - Abbreviation: CtT – Click to Trade
 - Abbreviation: ES – End of Session Matching
 - Abbreviation: QS – Quote Streaming
 - Abbreviation: E-RFQ – Electronic Request for Quote
- **Protocol Tenure:** Length of time that the protocol (not platform or parent company) has been operational
- **Securities Traded:** Securities traded on the protocol. Protocol may support additional securities and regions beyond the scope of the this report
- **Typical Target Trade Size:** Size of typical trade targeted on the protocol
- **Counterparty Interaction:** Permitted/targeted participant interaction
- **Order Visibility:** Order information available to other participants
 - No Information: No order/indication of interest (IOI) information is disclosed
 - Security Interest Displayed: Protocol only indicates which securities have open interest and no other attributes
 - Best Bid/Offer: Protocol only display best price for bid or offer (may or may not include size)
 - Permissioned/ Limited View: Protocol potentially provides some level of information about orders/IOIs and not all participants may receive the same information (Level 1 and Level 2 quote structure). Applicable to all E-RFQ and other protocols
 - Full Depth of Book: All participants are privy to all open orders
- **Order Type:** Differentiation between live and executable orders/no last look or subject/last look orders
- **Counterparty Visibility:** Disclosure of counterparty's identity
- **Trade Counterparty:** Manner in which trade execution is facilitated
 - Platform Intermediates All: Platform acts as the counterparty to both sides of trades
 - Single Third-Party Dealer: Protocol relies on a 3rd party Dealer designated by platform to intermediate trades and act as the counterparty to both sides of trades
 - Dealer Sponsored: Buy-side participants must designate a dealer of their own choosing to intermediate trades on their behalf
 - Direct: Counterparties directly face each other
- **Fee Structure:** Types of fee associated with trading on the platform
- **Others:**
 - Protocol provides suggestive pricing information. This includes but is not limited to suggested market prices, mid-point pricing between two counterparties, and price bands
 - Protocol allows for bilateral negotiations between participants

Summary of key traits of trading protocols (1/2)

Diagrams below illustrate key characteristics of the 42 trading protocols:

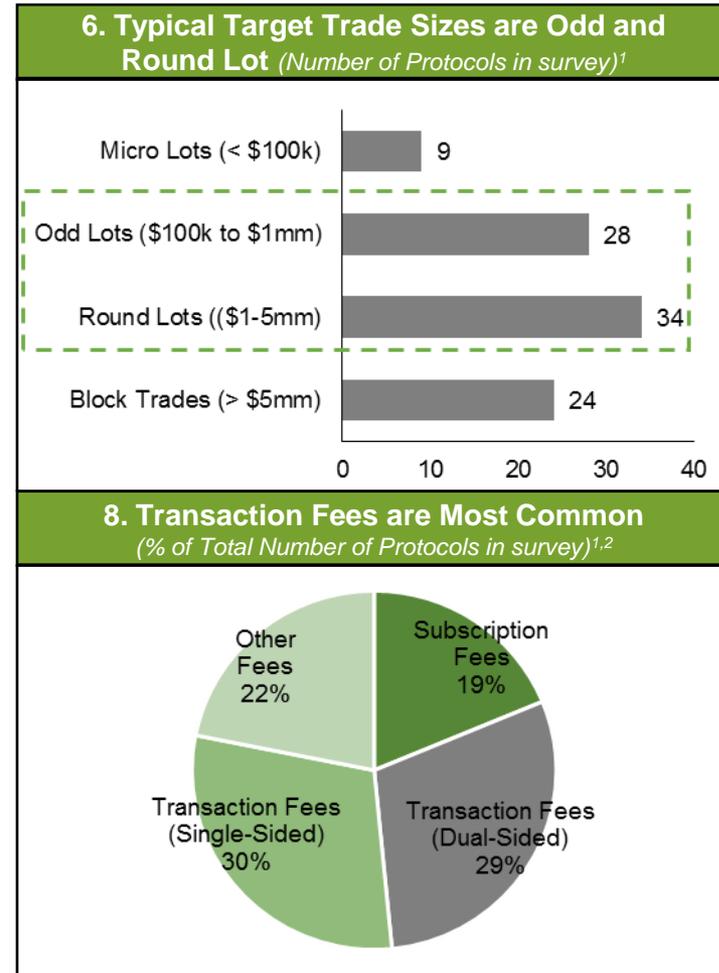
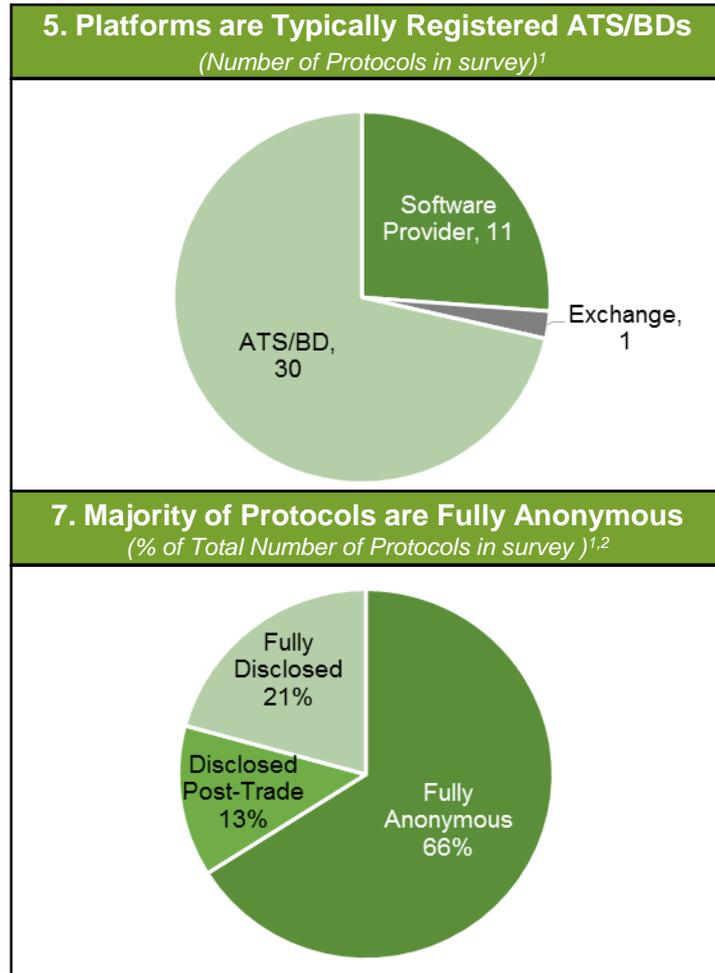


1. Based on data solely from our survey group including the platforms that have yet to launch. Percentages not calculated according to trading volumes
 2. Data demonstrated in chart is not mutually exclusive; therefore, the number of data points displayed in the chart does not equal to the total number of trading protocols

Citation: Platform interviews

Summary of key traits of trading protocols (2/2)

Diagrams below illustrate key characteristics of the 42 trading protocols:



1. Based on data solely from our survey group including the platforms that have yet to launch. Percentages not calculated according to trading volumes
 2. Data demonstrated in chart is not mutually exclusive; therefore, the number of data points displayed in the chart does not equal to the total number of trading protocols

Citation: Platform interviews

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Platform Profiles



Bloomberg

Bloomberg Platform Details

Bloomberg

Phone: 415.912.2960

Address: 731 Lexington Avenue, New York, NY 10022

Parent Firm	Platform Type	Product(s)	Category
Private – Independent	Varied by Protocol	Global Bonds	Operational Technology Provider

Platform Overview

Bloomberg is a global software, data, and media company that provides a variety of solutions to financial markets around the world. It has historically been a facilitator for traditional phone-based trading of fixed-income products and has more recently developed several protocols focused on electronic trading. Bloomberg has deployed two E-RFQ protocols, two dealer-intermediated protocols, and three Direct Execution Request protocols to facilitate electronic trading for fixed income securities. Bloomberg operates as a communication network and is not a party to the transactions on the platform. All trades are executed by third-party dealers.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: Bloomberg L.P., founded in October 1981 • Platform entity: Bloomberg L.P., electronic protocols launched at various times • FTE: Platform leverages parent's infrastructure (15k+ employees globally) • MPID: N/A
	Type of Platform <ul style="list-style-type: none"> • Platform category: Technology provider with three protocol types: <ul style="list-style-type: none"> – E-RFQs (two types): (a) BOLT (list trading multiple security RFQ) and (b) ALLQ (single security multi dealer RFQ). Both (a) and (b) are dealer to buy-side protocols – Dealer Intermediation (two types): (a) Bloomberg Bond Cross (BBX) (Europe and Asia) (technology provider to State Street, with customers transacting with State Street and anonymous to one another) and (b) BBX-DI U.S. (technology provider to one or more dealers, with customers transacting with common dealers and anonymous to one another) – Direct Execution Requests (single dealer inquiry) (three types): IMGR (multiple security quotes); QMGR (single security quote); ALLQ. All three support dealer to buy-side inquiry
	Target Participants <ul style="list-style-type: none"> • All protocols support liquidity providers and liquidity takers. BBX (Europe and Asia) requires the Bloomberg customer to have a relationship with State Street • Number of subscribers: ~325k subscribers total subscribers to the Bloomberg Professional service (BPS) • Number of active subscribers: N/A
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: Developed and emerging fixed-income markets • Product(s) traded: Developed and emerging sovereign and corporate fixed-income securities, inclusive of U.S. HY and IG corporate bonds and municipals bonds • Trade size(s): Micro lot, odd lot, and/or round lot, depending on the trading protocol
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • ATS registered and entity: N/A • Registered broker-dealer and entity: N/A • Regulator(s): N/A • Other licenses: N/A

Bloomberg – Platform Summary (2/2)

Topic		Details
Platform Summary	Other Services	<ul style="list-style-type: none"> • Other chargeable data services/add-ons: Majority of Bloomberg’s services are available as part of the Bloomberg Professional service subscription • Treasury spotting capabilities: Yes • Treasury hedging capabilities: Yes

Bloomberg – Platform Characteristics (1/2)

Topic	Details
Platform Characteristics Trading Procedures and Protocol	<p>Bloomberg Professional service subscribers can only trade with dealers with which they have pre-established relationships within the three protocol types: E-RFQs, Dealer Intermediation, and Direct Execution Requests (Single dealer inquiry) detailed below:</p> <ul style="list-style-type: none"> • E-RFQs (BOLT and ALLQ) <ul style="list-style-type: none"> – BOLT allows the initiator to generate an RFQ for up to 40 CUSIPs simultaneously for multiple dealers – ALLQ allows the initiator to generate an RFQ for a single CUSIP for multiple dealers – Both protocols facilitate dealer to buy-side transactions – BOLT List RFQs include CUSIP(s), size, direction, and “Due In” (expiration time) – BOLT List dealers can respond with quotes for all securities, a select group of securities, or an individual security by the Due In time – BOLT List prices are live and executable for a predetermined amount of time post the Due In time, after which point they are subject – The RFQ initiator can see the best price and full depth of submitted quotes • Dealer Intermediation (Bloomberg Bond Cross (“BBX”)) <ul style="list-style-type: none"> – BBX supports transactions with dealers with anonymity to the dealer’s other customers in corporate bonds – Subscribers enter Indications of Interest (IOIs) for a given CUSIP with direction and size – BBX has two regional models: (1) BBX (Europe and Asia) and (2) BBX-DI U.S. (subscribers select one or the other depending on whether they are located in or outside the United States) – BBX Europe: <ul style="list-style-type: none"> ▪ Facilitates trading in corporate bonds, round lot trade size ▪ All subscribers must have a pre-established relationship with State Street to participate. State Street acts as counterparty for all trades ▪ Subscribers must include a target price within the IOI ▪ If there are potentially offsetting IOIs, both subscribers are notified and a State Street calculated midpoint price (MP) is presented to them ▪ If both subscribers accept State Street’s MP, State Street executes the trade – BBX-DI U.S.: <ul style="list-style-type: none"> ▪ Facilitates trading in U.S. dollar-denominated corporate bond for both odd and round lots ▪ Target price submission is optional within the indication because it is negotiated with the dealer after two potentially offsetting indications from subscribers are identified based on CUSIP and direction ▪ If there are two potentially offsetting IOIs, both subscribers are notified and are presented with the option to bilaterally negotiate with a common dealer intermediary on an RFQ basis ▪ From the buy-side’s perspective, the platform facilitates the discovery of a common intermediary dealer, one dealer with whom both participants have an established relationship and who is given the option to act as counterparty

Bloomberg – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol (cont'd)	<ul style="list-style-type: none"> • Direct Execution Requests (IMGR, QMGR, ALLQ) <ul style="list-style-type: none"> – IMGR, QMGR and ALLQ facilitate dealer to buy-side transactions. Minimum trade size for IMGR and QMGR is \$500k. ALLQ has no minimum trade size – IMGR displays a multi-security view and offers a filtering functionality, while QMGR displays a single security view with additional detailed information regarding the security – Dealers provide indicative pricing to permissioned subscribers for a large selection of securities – Permissioned buy-side subscribers have a consolidated view of indicative pricing – Executable prices are available via liquidity taker submitting an RFQ
	Price Formation and Transparency	<ul style="list-style-type: none"> • Security price transparency is available to all Bloomberg Professional service subscribers. Dealer-based pricing related to specific securities is dependent on dealer controlled viewing and/or trading enablement • Execution price trade transparency is dependent on trading protocol: <ul style="list-style-type: none"> – E-RFQ: Executing dealer receives “accepted notification”, covering dealer gets “cover” notification, and all other dealer participants in the RFQ receive a “Traded Away” notification – BBX-DI US: Customer and dealer negotiate price. Only trade counterparties can see trade details – BBX (Europe and Asia): Trade counterparties can only see the MP when potentially offsetting IOIs are identified and actioned. Only trade counterparties can see trade details – Direct Execution Requests (Single dealer inquiry): The executing dealer and the liquidity taker are notified of executed status. Only trade counterparties can see trade details
	Counterparty Protocol	<ul style="list-style-type: none"> • The counterparty protocol depends on the trading protocol: <ul style="list-style-type: none"> – E-RFQ: Dealers enable counterparties to trade with them on a disclosed basis – BBX (Europe and Asia): Must have a relationship with State Street to trade; anonymity to other buy-side customers of State Street – BBX-DI U.S.: Must have a common dealer in order to trade; anonymity to the other customer of the dealer – Direct Execution Requests (single dealer inquiry): Dealers enable counterparties to trade with them on a disclosed basis
	Fee Structure	<ul style="list-style-type: none"> • Trading functions are included without extra charge in the Bloomberg Professional service subscription • Data fees/additional service fees: None. No additional fees for in-terminal use • Incentives/Rebates: N/A

Bloomberg – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the subscriber level (on boarded entities), and user level – Dealers on the platform have to enable subscribers to view their pricing information and to trade with them – Access: Each subscriber has individual logins to access the platform Global kill switch: Yes. Each subscriber can also cancel all of their open orders prior to execution Subscriber imposed limits: Yes. Subscribers can input maximum size alerts for individual traders
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis: Yes, Bloomberg provides competing quotes data and depth of market information to subscribers to demonstrate best execution
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Trading functions are included without extra charge in the Bloomberg Professional service subscription – Subscribers must independently, over the terminal, establish trading and viewing enablement KYC/AML procedures: <ul style="list-style-type: none"> – Structure: Dealer enablement based system; enabling dealers bear KYC/AML responsibilities for customers they enable
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Trade dispute and erroneous trade policy – Dealer and customer manage directly
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> The Bloomberg Professional service provides various Risk, Reporting and Compliance tools

Bloomberg – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Client-installed desktop software Supports FTP feeds Access and supports FIX 4.4 messaging
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: Yes Bid-list processing: Yes
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: Bloomberg has two data centers run in a hot/hot configuration <ul style="list-style-type: none"> Primary system: Owned hardware in private facility Secondary system: Owned hardware in private facility
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Products and Participants: <ul style="list-style-type: none"> Enhance capabilities and expansion of included securities, for example, will allow for live and executable trades for emerging market debt within IMGR and QMGR
	Additional Notes and Comments	<ul style="list-style-type: none"> None



Electronifie Platform Details

Electronifie

Phone: 646.517.6540

Address: 330 Hudson Street, Suite 302, New York, NY 10013

Parent Firm	Platform Type	Product(s)	Category
Private – Independent	All to All	Corporate Bonds (HY and IG)	Operational Trading Platform

Platform Overview

Electronifie has two order books, one Displayed and one Hidden, which function simultaneously to facilitate price discovery and which only permit firm and executable orders. When a trade of \$1mm or more is executed in either of the order books, a 10-minute Matching Session is automatically launched to allow other participants to trade at the same price.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: Electronifie Inc., founded in May 2013 • Platform operating entity: Electronifie Securities LLC, platform launched in May 2015 • FTE: 22 Total; Split between 6 sales representatives, 8 technology; 8 operations/management • MPID: ELET
	Type of Platform <ul style="list-style-type: none"> • Platform category: Three protocols: (1) Displayed Order Book (LOB/QS/CtT), (2) Hidden Order Book , and a (3) Platform-Wide Matching Sessions (End of Session Matching) • All to All platform that is non-attributed (anonymous)
	Target Participants <ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants • Certain Dealers on the platform agree to make markets and aid price discovery; these Dealers are classified as “Designated Market Makers” (“DMMs”) • Number of participants: 82 total (3 DMMs and 79 firms) (58 Buy-Side and 24 Dealer)
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: US Fixed Income markets • Product(s) traded: HY and IG Corporate Bonds (registered and unregistered 144A) • Trade size(s): Odd lot, round lot, with a focus on block trades
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • ATS registered and entity: Yes; Electronifie Securities LLC • Registered Broker Dealer and entity: Yes; Electronifie Securities LLC • Regulator(s): FINRA and SEC • Other licenses: None
	Other Services <ul style="list-style-type: none"> • Other chargeable data services/add-ons: None • Treasury spotting capabilities: Yes; via third party data feed • Treasury hedging capabilities: None

Electronifie – Platform Characteristics (1/2)

Topic	Details
<div style="writing-mode: vertical-rl; transform: rotate(180deg);">Platform Characteristics</div> Trading Procedures and Protocol	<p>Platform facilitates trading through three trading protocols that are all fully anonymous. There are two protocols, Displayed and Hidden Order Books, which function independently and consist of firm and executable orders (trading hours 8:15AM-4:30PM EST). Once a \$1mm+ trade is executed in either the Displayed or Hidden Order Book, a platform-wide Matching Session is automatically launched to allow other participants to trade at the Matching Session price</p> <ul style="list-style-type: none"> • Displayed Order Book (LOB/QS/CtT) <ul style="list-style-type: none"> – Functions like an anonymous CLOB where participants can see full depth of book and click-to-trade – DMMs stream prices via live orders to give pricing context to all participants, and participants can post live orders as well – Minimum order size: \$200k • Hidden Order Book <ul style="list-style-type: none"> – Aimed to match hidden round/block orders, where all participants can enter non-attributed (anonymous) orders to trade large quantities of a certain bond – All participants have the opportunity to place orders and trade in a bond where only CUSIPs are displayed for orders (interest in securities); All other order details are confidential (e.g., participant identity, size, side, price) – Matching priority order: Time – Minimum order size: \$1mm • Platform-Wide Matching Session (End of Session Matching) <ul style="list-style-type: none"> – After a trade of \$1mm or greater has been matched on either the Displayed or Hidden Order Book, a 10 minute matching session for trading in the matched security at the matched price launches immediately – All participants are notified about the Matching Session, the security, and the price – Matching Sessions vary based on where the initial match occurred (i.e. in the Displayed or Hidden Order book): <ul style="list-style-type: none"> ▪ Displayed Order Book: The initial match from the Displayed Order Book is confirmed and executed immediately. Participants can enter other orders into the Matching Session that can be amended or cancelled until the session ends. When the session ends, participants are notified of matches, and the matched trades are executed ▪ Hidden Order Book: The initial match from the Hidden Order Book is confirmed but not executed immediately. Participants can enter other orders into the Matching Session that can be amended or cancelled until the session ends. When the session ends, participants are notified of matches, and the matched trades (including the initial match) are executed – Matching priority order: Time – Minimum order size: \$1mm

Electronifie – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Price Formation and Transparency	<ul style="list-style-type: none"> Level of price transparency differs by protocol: <ul style="list-style-type: none"> – Displayed Order Book: All posted prices and order sizes are seen by all participants pre trade; executed prices are displayed post trade – Hidden Order Book: Only the CUSIP is seen by all participants pre-match; executed prices are displayed post trade – Matching Session: CUSIP and Matching Session price are displayed DMM responsibility: DMMs stream live and executable prices for ~2,400 securities on the Displayed Order Book, with a minimum order size of \$200k. However, any participant can post a live and executable order to the Displayed book as well
	Counterparty Protocol	<ul style="list-style-type: none"> Only trade counterparties are privy to execution order details for their trade facing Electronifie, while other participants can see price information on the platform or on TRACE (all securities are TRACE-eligible) All non-Dealer participants (Buy-Side) must elect an Intermediating Broker Electronifie will act as the riskless counterparty to buyers and sellers of all trades on the platform All trades are cleared and settled through the Industrial and Commercial Bank of China (ICBC)
	Fee Structure	<ul style="list-style-type: none"> Platform charges non-negotiable transaction fees: <ul style="list-style-type: none"> – Fees are based on product type, and differ per trading protocol: <ul style="list-style-type: none"> ▪ Displayed Orders: Fees are single-sided with a mark-up or mark-down, only the aggressor pays (price taker) <ul style="list-style-type: none"> • For HY, fees are 1/16bps • For IG, fees are 1/2bps ▪ Hidden Orders and the Matching Session: Fees are dual-sided with a mark-up and mark-down <ul style="list-style-type: none"> • For HY, fees are 1/16bps • For IG, fees are 1/2bps – Transaction fees are included in the trade price Data fees/Additional service fees: None Incentives/Rebates: Yes; Electronifie offers incentives to DMMs who meet their obligations based on market making activity and can have profit sharing agreements (based on performance)

Electronifie – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities), desk level, and trader level; Electronifie can also establish maximum trade sizes dictated by credit limits at these levels – Participants can select the time of order expiry. Orders are valid unless expired, canceled or until the trading day is over. Participants are force logged out in the evening (after trading hours) Global kill switch: Yes; Platform can cancel all open orders at the platform, participant, and security level. In addition, participants can cancel or suspend all open orders Participant imposed limits: Yes; At the participant level
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: None Trade reports: Yes
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Participants must be a QIB (with introducing Dealer) or a Dealer – Platform performs individual participant and jurisdiction checks; Onboarding process can take as little as a few days (depending on participant's internal process) KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes; but minimal. In addition, Buy-Side candidates will be onboarded to trade through an intermediating Dealer
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices and monitoring capabilities: Monitored Off-market trade review, erroneous trade policy, trade dispute: <ul style="list-style-type: none"> – Platform has a firm written policy that covers all of these situations – Policy involves objective criteria and a committee to review the particular facts of a dispute – A Clearly Erroneous Policy exists for any errors that may occur
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

Electronifie – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Web-based interface via OpenFin Supports FIX 4.4 messaging and provides API
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Integrates with several OMS/EMS Provides STP to the clearing house – CRD integration is complete Bid-list processing: N/A; However, participants have several methods to enter bulk orders simultaneously (e.g. paste from Excel, import from staged orders in their OMS, etc.)
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Third-party servers Secondary system: Yes Only Electronifie Operations and Compliance personnel have access to trade data; Sales personnel can only access restricted order/trade data
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Technology and Integration: <ul style="list-style-type: none"> Plans to integrate with additional major OMSs Products and Participants: <ul style="list-style-type: none"> Electronifie will consider expanding to clients and product markets to EMEA Electronifie will consider adding other asset classes in the platform (e.g., CLOs) as well as the ability to hedge treasuries
	Additional Notes and Comments	<ul style="list-style-type: none"> None



GFI Group: GFI and Latium Platform Details

GFI Group: GFI & Latium

Phone: 212.968.4100

Address: 55 Water Street, New York NY 10041

Parent Firm	Platform Type	Product(s)	Category
Public	Varied by protocol	Corporate Bonds (HY and IG)	Operational Trading Platform

Platform Overview

BGC Partners, Inc. (“BGC”), a global brokerage company servicing the financial and real estate markets, acquired GFI Group Inc. (“GFI”), an intermediary and provider of trading technologies and support services to the global OTC and listed markets. GFI operates as a division of BGC, and has two electronic trading platforms that facilitate Corporate Bond trading – GFI and Latium, and each leverage GFI’s proprietary fixed income technology, CreditMatch.

Topic	Details
Platform Summary	<p>Corporate Structure & Additional Details</p> <ul style="list-style-type: none"> • Parent name: BGC Partners L.P., founded in 1945, BGC acquired GFI Group in 2015, the parent company of the GFI and Latium electronic trading platforms • FTE: The two platforms (GFI and Latium) combined have ~30 dedicated FTE. Platforms leverages parent company infrastructure for support <p>GFI:</p> <ul style="list-style-type: none"> • Platform entity: GFI Securities LLC, platform launched in 2002 • MPID: GFIG <p>Latium:</p> <ul style="list-style-type: none"> • Platform entity: GFI Securities LLC, platform launched in May 2013 • MPID: LATG
	<p>Type of Platform</p> <p>GFI:</p> <ul style="list-style-type: none"> • Dealer to Dealer • Platform category: Matching Session (Real-Time Matching) <p>Latium:</p> <ul style="list-style-type: none"> • Currently Dealer to Dealer but launching Dealer to Buy-Side in early 2016 • Platform category: Two protocols (1) Matching Session (Real-Time Matching) and (2) E-RFQ (launching in conjunction with Dealer to Buy-Side capability)
	<p>Target Participants</p> <p>GFI:</p> <ul style="list-style-type: none"> • Targets Dealer participants • Number of participants: 80 Dealers • Number of active participants: All participants <p>Latium:</p> <ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants – Buy-Side access to be launched in the near future • Number of participants: 80 Dealers • Number of active participants: All participants

GFI and Latium – Platform Summary (2/2)

Topic		Details
Platform Summary	Product and Market Focus	<p>GFI:</p> <ul style="list-style-type: none"> • Product geography: US and Emerging Fixed Income markets • Product(s) traded: Trades CDS, CMX Index, (HY and IG) Corporate Bonds (registered, unregistered 144A, and Reg-S), and Emerging Market Debt (Sovereigns and Corporates), local currencies in Mexico, Chile, Argentina, and Columbia • Trade size(s): Odd lot and round lot (minimum ranges from \$500k-\$1mm depending on security) <p>Latium:</p> <ul style="list-style-type: none"> • Product geography: US and Other Developed Fixed Income markets (specifically European focused) • Product(s) traded: Trades CDS (HY and IG), Corporate Bonds (registered, unregistered 144A, and Reg-S) • Trade size(s): Round lot (minimum size: ranges from \$500k-\$1mm depending on security)
	Registrations and Regulatory Oversight	<p>Both Platforms:</p> <ul style="list-style-type: none"> • ATS registered and entity: Yes; Both GFI and Latium are registered as separate ATSs under one legal entity, GFI Securities LLC • Registered Broker Dealer and entity: Yes; GFI Securities LLC • Regulator(s): FINRA, SEC, CFTC, and NFA • Other licenses: None

GFI and Latium – Platform Characteristics (1/2)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>Both Platforms: Both GFI and Latium host Matching Sessions for Dealer to Dealer trading. Latium is planning to add Buy-Side participants to its existing Matching Session and planning to launch an E-RFQ trading protocol where the Buy-Side can initiate RFQs to Dealer participants. Trading hours for both platforms are between 7:00AM EST-5:00PM EST</p> <ul style="list-style-type: none"> • Matching Session (Real-Time Matching) <ul style="list-style-type: none"> – GFI supports only Dealer to Dealer transaction, orders are both round and odd lots depending on the session. Latium currently supports Dealer to Dealer but is expanding to Dealer to Buy-Side transactions, orders are typically round lots – Matching Sessions occur throughout the day. The majority of sessions are run on a scheduled-basis; however, there is flexibility to host with sector-specific and sporadic sessions if and when needed – The platform determines the sector for the sessions, session time frame (length of time can be changed), the specific CUSIPs, and the midpoint prices (MP) – Platform algorithmically determines MP through GFI's own data (input from the internal feeds), TRACE data, and input from traders – Once a session commences, participants can submit live and executable orders into the Matching Session – All participants can see that a specific security has an open order via a color change on their display; however, direction, size, and counterparty are not disclosed – Matching occurs real-time throughout the session on a time priority • E-RFQ (Latium Only) <ul style="list-style-type: none"> – Latium expects to launch an E-RFQ protocol to support Dealer to Buy-Side transactions – Buy-Side participants initiate an RFQ by entering in CUSIP (single security), direction, size, expiration time, and select responding Dealer(s) – The initiating counterparty will be disclosed to the respondents – Dealers responses to the RFQ are live and executable and initiator can accept quotes prior to the expiration time
	Price Formation and Transparency	<p>Both Platforms:</p> <ul style="list-style-type: none"> • The level of price transparency varies by trading protocol: <ul style="list-style-type: none"> – Matching Session: Midpoints are displayed to all participants and a color coding mechanism demonstrates whether a participant has demonstrated interest at a displayed price – E-RFQ: Initiating participant can see all quotes that are submitted prior to the expiration time. The cover is notified that they are the cover for the RFQ

GFI and Latium – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Counterparty Protocol	<p>Both Platforms:</p> <ul style="list-style-type: none"> • Only trade counterparties are privy to order details, while other participants can only see trade information on TRACE (if the security is TRACE-eligible) • GFI Securities intermediates all trades as the riskless counterparty; all trades are self-cleared and settled through BGC Financial (parent) • The level of counterparty visibility varies by trading protocol: <ul style="list-style-type: none"> – GFI: Trade counterparties are fully anonymous – Latium: For matching sessions the counterparties are fully anonymous unless the clients have preselected to disclose their names to their counterparty at the end of the session (D2C only). Buy-Side participants cannot be matched directly with other Buy-Side participants, but can be intermediated by a third party dealer. For the E-RFQ, the initiator's name is displayed (Buy-Side participant) to receiving Dealer participants
	Fee Structure	<p>Both Platforms:</p> <ul style="list-style-type: none"> • Platform charges non-negotiable transaction fees: <ul style="list-style-type: none"> – Fees are dual-sided through a bilateral mark-up and mark-down and are included in the trade price: <ul style="list-style-type: none"> ▪ For IG: 1/32 bps ▪ For HY: 1/16 bps • Data fees/Additional service fees: None • Incentives/Rebates: None

GFI and Latium – Platform Risk, Reporting, and Compliance

Topic	Details
Platform Risk, Reporting, and Compliance	<p>Both Platforms:</p> <ul style="list-style-type: none"> • Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities), desk level, and trader level – Credit limits are place at the entity level – Fat finger checks are in place for the max order size, and has a price threshold alert that lets participants know their order is a specified percentage away from the market price – Platform allows traders to place only one order for a single instrument – Platform provides a second popup alert to verify your order is correct upon submission • Global kill switch: Yes, platform can cancel all open orders at the platform level. In addition, participants have the ability to cancel all of their open orders prior to execution • Participant imposed limits: Yes, Latium can provide this upon request
	<p>Both Platforms:</p> <ul style="list-style-type: none"> • Best execution analysis/TCA: None
	<p>Both Platforms:</p> <ul style="list-style-type: none"> • Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Dealer participants are onboarded on a case-by-case basis – Platform developing and finalizing onboarding process for Buy-Side participants • KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: N/A, platform self-clears with its parent company, BGC Financial
	<p>Both Platforms:</p> <ul style="list-style-type: none"> • Abusive trading practices and monitoring capabilities: Monitored • Off-market trade review, erroneous trade policy, trade dispute: Platform has a firm written policy in place
	<ul style="list-style-type: none"> • None

GFI and Latium – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<p>Both Platforms:</p> <ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Web-based and client installed interface Supports FIX 4.4 and provides API
	Integration Capabilities	<p>Both Platforms:</p> <ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Provides STP via the FIX protocol (participants connect through their own OMS) Has an automated confirmation process with Bloomberg VCON (not all participants are STP connected) Provides white label services related to platform technology Bid-list processing: N/A
	Data Security and Platform Reliability	<p>Both Platforms:</p> <ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Owned hardware in NY4 data center, through SunGard Secondary system: Yes
Additional Platform Information	Short to Medium Outlook	<p>Both Platforms:</p> <ul style="list-style-type: none"> Technology and Integration <ul style="list-style-type: none"> Working on developing OMS connectivity, currently working to complete OMGEO integration <p>Latium:</p> <ul style="list-style-type: none"> Products and Participants: <ul style="list-style-type: none"> Plans to add Buy-Side participants to Matching Sessions and E-RFQ in the near future
	Additional Notes and Comments	<ul style="list-style-type: none"> None



ITG: POSIT[®] FI Platform Details

ITG: POSIT FI

Phone: 212.588.4000

Address: 1 Liberty Plaza, 165 Broadway, New York, NY 10006

Parent Firm	Platform Type	Product(s)	Category
Public	All to All	Corporate Bonds (HY and IG)	Operational Trading Platform

Platform Overview

ITG Inc., an independent execution broker and financial technology provider, was founded 28 years ago when it launched its POSIT dark pool technology. This technology was developed for Buy-Side and Dealers to anonymously source liquidity and prevent the market impact of large orders. In 2014, ITG applied its POSIT infrastructure to its dark pool and crossing network for fixed income securities. This electronic trading platform facilitates trading in Corporate Bonds.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> Parent name: Investment Technology Group, Inc., founded in 1987 Platform entity: ITG Inc., launched platform in October 2014 FTE: 4 split between product groups and sales. The platform leverages parent infrastructure (1,000+ employees) for support MPID: 2 identifiers: (1) Voice trades: ITGI (2) Dark Pool/Matching Session trades: ITGP
	Type of Platform <ul style="list-style-type: none"> Platform category: Two protocols: (1) Dark Pool (2) Matching Session (End of Session Matching) All to All platform that is fully anonymous
	Target Participants <ul style="list-style-type: none"> Targets Buy-Side and Dealer participants Number of participants: 60 total; Platform has 45 Buy-Side and 15 Dealer relationships Number of active participants: All 60 participants
	Product and Market Focus <ul style="list-style-type: none"> Product geography: US and Emerging Fixed Income markets Product(s) traded: HY and IG Corporate Bonds (registered, unregistered 144A, Reg-S), Sovereigns & Emerging Market Debt Trade size(s): Odd lot and round lot
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> ATS registered and entity: Yes; ITG Inc. Registered Broker Dealer and entity: Yes; ITG Inc. Regulator(s): FINRA and SEC Other licenses: NFA, and all principal exchanges
	Other Services <ul style="list-style-type: none"> Other chargeable data services/add-ons: None Treasury spotting capabilities: Yes; via an internal Treasury feed Treasury hedging capabilities: None ITG offer electronic order routing services to third-party liquidity pools

ITG: POSIT FI – Platform Characteristics (1/2)

Topic	Details
<div style="writing-mode: vertical-rl; transform: rotate(180deg);">Platform Characteristics</div> <div style="text-align: center;"> Trading Procedures and Protocol </div>	<p>Platform offers two trading protocols for trading Corporate Bonds, a Dark Pool and Matching Session. ITG provides a midpoint price (MP) for both trading protocols that is determined algorithmically based on data from their live market feeds, trade related data from TRACE and an evaluated pricing source. The algorithm detects outliers to avoid MP skewing. Details on both protocols are as follows:</p> <ul style="list-style-type: none"> • Dark Pool - Continuous Crossing <ul style="list-style-type: none"> – Participants place anonymous IOIs or conditional/firm orders into ITG’s Dark Pool. IOIs include a specific CUSIP, direction (buy or sell), size (not disclosed to others) and price (optional) – POSIT’s algorithm searches to locate offsetting IOIs and liquidity. When a match occurs, each counterparty is notified of a trading opportunity via an Alert pop-up, with an option to engage or not – If both sides go “alive”, an anonymous bilateral negotiation is started and the ITG MP is used as a suggested level, however each side can enter a starting bid or offer of their choosing – If multiple IOIs match, priority is given to the first counterparty that goes “alive”. If the first participant cannot come to an agreement, then the second participant is matched – In efforts of protecting information leakage, the following process is followed: <ul style="list-style-type: none"> ▪ If either counterparty does not accept the proposed ITG MP, the counterparty that enters an initial level closer to ITG’s MP will get the first look in the negotiation ▪ If both counterparties do not come to an agreement, the negotiation terminates – no size is revealed ▪ Symmetrical information give up – Minimum trade size: \$1mm • Matching Sessions <ul style="list-style-type: none"> – ITG may conduct regularly scheduled or market driven matching sessions throughout the day. Prior to the matching session, ITG determines the eligible securities (based on market events and other inputs) and notifies potentially interested participants based on previous orders, open interest in the Dark Pool, and other factors – During the time leading up to the session, participants can enter and amend their pre-session orders (e.g., size, residual constraints, and price protection levels) – When the session commences, all orders at or better than the ITG MP will be live and executable at ITG’s calculated MP price, and matched accordingly – ITG’s algorithm focuses on matching the largest trades and maximizing trade completeness on a size then time priority – Participants have the ability to transfer IOIs from the Dark Pool to the matching sessions, and thereby converting the IOIs to live and executable orders – Minimum trade size: \$500k

ITG: POSIT FI – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Price Formation and Visibility	<ul style="list-style-type: none"> • Each trading protocol leverages ITG’s Pricing Engine, which prices over 15,000 bonds in real-time • Order details are anonymous to all participants, from initiation to trade execution and clearing • All participants can see the ITG determined MP in each trading protocol
	Counterparty Protocol	<ul style="list-style-type: none"> • Only trade counterparties are privy to their order details, while other participants can only see price information on TRACE if the security is TRACE-eligible • ITG will act as the riskless counterparty to buyers and sellers of all trades on the platform, and all trades are cleared and settled through ITG
	Fee Structure	<ul style="list-style-type: none"> • Platform charges non-negotiable transaction fees: <ul style="list-style-type: none"> – Fees are dual-sided with a bilateral mark-up and mark-down, within the following pricing matrix: <ul style="list-style-type: none"> ▪ The price for all newly issued bonds (HY & IG) from the first day traded to settlement date are \$50 per million of par at the long end ▪ For IG, there are also four maturity buckets: \$50 per million of par at the short end progressing to \$300 per million of par at the long end ▪ For HY, there are four maturity buckets: \$150 per million of par at the short end progressing to \$450 per million of par at the long end – Transaction fees are included in the price of the trade • Data fees/Additional services fees: None • Incentives/Rebates: None

ITG: POSIT FI – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities), trader level, and desk level – Access: Each participant has individual logins to access the platform – Platform has limits in place on order size and protected levels – All participants have Single Order Value limits to prevent inadvertent notional trade sizes (fat finger errors) – ITG sets credit limits: total maximum aggregate trading limit and maximum individual trade size limit – While trades may be executed outside the bid/offer spread, ITG requires that the execution price still be within the threshold tolerance of its MP to minimize the chance of off-market trades – ITG proactively monitors participants' usage and behaviors within the trading sessions Global kill switch: Yes; Platform has the ability to cancel all open orders at the platform level. In addition, participants can cancel all of their own open orders Participant imposed limits: None
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: None
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – ITG evaluates potential participants on a case-by-case basis – ITG has suggested a minimum of \$100mm in assets for potential participants KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: N/A; ITG self-clears
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices and monitoring capabilities: Monitored Off-market trade review, erroneous trade policy, trade dispute: <ul style="list-style-type: none"> – Platform has an erroneous trading policy in place – Platform has 'market standard' trade dispute policies in place; if needed it can resolve disputes unilaterally – Final decisions are at the platform's discretion
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

ITG: POSIT FI – Platform Technology and Add'l Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Client installed desktop software Offers multiple integration points for EMS, OMS, and POSIT® Alert interface Supports FIX 4.2 and 4.4 messaging
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Participants can send IOIs or orders to ITG in a number of ways: <ul style="list-style-type: none"> Through one of six OMS/EMS vendors FIX connectivity Excel uploads and cut/paste capabilities Direct entry into the platform front-end Bid-list processing: N/A
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Owned hardware Secondary system: Yes
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Technology and Integration: <ul style="list-style-type: none"> Expects integration of approximately 2-3 new OMSs in the near future Building increased connecting capabilities for order routing functionality Products and Participants: <ul style="list-style-type: none"> Developing treasury hedging capabilities Plans to expand to non-US clients trading US products, followed by non-US clients trading non-US products Reports: <ul style="list-style-type: none"> Launched daily market commentary report that leverages ITG's propriety price data in Q1,2016
	Additional Notes and Comments	<ul style="list-style-type: none"> None



KCG BondPoint Platform Details

KCG BondPoint

Phone: 800.544.7508

Address: 545 Washington Blvd #3, Jersey City, NJ 07310

Parent Firm	Platform Type	Product(s)	Category
Public	All to All	Corporate Bonds (HY and IG) and Municipal Bonds	Operational Trading Platform

Platform Overview

KCG BondPoint is an electronic fixed income trading solution that delivers access to centralized liquidity and automated trade execution services. The platform trades through two protocols, E-RFQ and a LOB/QS/CtT, the latter offering pre-trade anonymous live and executable orders. Buy-Side clients trade anonymously since KCG facilitates clearance and settlement of transactions.

Topic		Details
Platform Summary	Corporate Structure & Additional Details	<ul style="list-style-type: none"> Parent name: KCG Holdings, Inc. ("KCG"), founded in 2013 after a merger between Knight Capital Group, Inc. (1995) and GETCO Holding Company, LLC (1999) Platform entity: KCG BondPoint ATS ("KCG BondPoint") sits under the KCG subsidiary KCG Americas LLC ("KCGA"). Platform originated in 1999 as Valubond. It was purchased by Knight and rebranded as BondPoint in 2006 FTE: ~50 employees assigned to the platform; Platform leverages parent infrastructure for support (1,100+ employees) MPID: VABD
	Type of Platform	<ul style="list-style-type: none"> Platform category: Two protocols (1) E-RFQ and (2) LOB/QS/CtT that are both All to All and have differing anonymity: <ul style="list-style-type: none"> – Dealer to Dealer trades are post-trade disclosed – Dealer to Buy-Side and Buy-Side to Buy-Side trades are fully anonymous
	Target Participants	<ul style="list-style-type: none"> Targets Buy-Side and Dealer participants Client base is primarily US based, ~5% is international Number of participants: ~740 total, 55% Buy-Side participants and 45% Dealer participants Number of active participants: ~450 total
	Product and Market Focus	<ul style="list-style-type: none"> Product geography: US Fixed Income markets Product(s) traded: HY and IG Corporate Bonds (registered, unregistered 144a, and Reg-S), Municipal Bonds, CDs, Agency MBS, Government Debt Securities that are USD-denominated and DTC eligible Trade size(s): All sizes, primarily odd lot and micro lot
	Registrations and Regulatory Oversight	<ul style="list-style-type: none"> ATS registered and entity: Yes; KCG BondPoint ATS Registered Broker Dealer and entity: Yes; KCG Americas LLC Regulator(s): FINRA, SEC, MSRB Other licenses: None

KCG BondPoint – Platform Summary (2/2)

Topic		Details
Platform Summary	Other Services	<ul style="list-style-type: none"> • Other data services/add-ons: Yes; Platform provides customized trading and workflow solutions: <ul style="list-style-type: none"> – BondScope: A fully customizable electronic surveillance tool that provides pre- and post-trade transaction oversight – Broker Workstation: Customizable White Labeled Fixed Income product providing access and trading capabilities for multiple channels including brokers, advisors and their customers – Trader Workstation: Provides advanced Fixed Income trading capabilities to trading professionals. Web-based platform enables direct market access to the platform for price discovery, analytics and trade execution • Treasury spotting capabilities: Yes, via third-party pricing sources • Treasury hedging capabilities: None

KCG BondPoint – Platform Characteristics (1/2)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>Platform hosts two All-to-All trading protocols for trading fixed income securities including an E-RFQ and LOB/QS/CtT:</p> <ul style="list-style-type: none"> • E-RFQ <ul style="list-style-type: none"> – All participants can initiate RFQs by submitting CUSIP, size, direction, and response time. Permissioned Dealers as well as all Buy-Side participants may view and respond to requests – Participants can only submit RFQs to Dealers they are permissioned to trade with – Respondents are anonymous during the RFQ process. Responses are all or none (no partial fills) and are displayed to the initiator based on price and time priority – Upon reaching an agreement, respondents have a last look before execution • LOB/QS/CtT <ul style="list-style-type: none"> – Orders are live and executable and participants are able to place orders on the platform 24 hours a day. However, transactions are only crossed from 8:00 AM – 5:00 PM EST Monday through Friday. Orders not placed during the crossing period are queued for the next available trading day. All quotes are considered firm, but liquidity providers may choose whether a quotation is auto-executed or the provider must confirm the trade – Protocol allows All to All trading, however, Dealers can specify who is permissioned to view their orders and trade with them – Participants can see an aggregate order book customized on their permissioning – Liquidity providers enter orders with prices, total size, minimum size, minimum increments, minimum remaining size, and resting period (maximum is until end of day) – Liquidity takers can enter all-or-none limit orders for resting orders – KCG has the ability to sweep the order book and consolidate smaller orders to fill a larger order in the opposing direction. KCG intermediates the trade as the riskless counterparty and provides the counterparty with the larger order a single ticket that is the weighted average price of the smaller orders – Protocol allows for price negotiation between counterparties – Other KCGA divisions may participate in BondPoint as a subscriber
	Price Formation and Transparency	<ul style="list-style-type: none"> • Price transparency varies by trading protocol: <ul style="list-style-type: none"> – E-RFQ: <ul style="list-style-type: none"> ▪ Participants that submit a non-winning response are provided their rank relative to the winning bid and price ▪ Dealers control which participants can send RFQs to them – LOB/QS/CtT: <ul style="list-style-type: none"> ▪ Participants have visibility of the full depth of the order book (limited by their permissioning) ▪ Dealers control which participants can view/trade their orders ▪ Platform participants are provided with the most recent price for a security traded on the platform if they are axed in the same security

KCG BondPoint – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Counterparty Protocol	<ul style="list-style-type: none"> • Counterparty transparency is dependent on which type of participants are involved: <ul style="list-style-type: none"> – Dealer to Dealer: Trades are settled and cleared between Dealers, KCGA does not intermediate. Counterparties are only anonymous pre-execution and trades occur on the platform – Dealer to Buy-Side and Buy-Side to Buy-Side: KCGA intermediates on behalf of the Buy-Side and acts as the riskless principal for the trades; trades counterparties are anonymous pre- and post-trade – Book Sweeps (where several smaller orders are matched with a larger order): KCGA intermediates and acts as the riskless principal for all trades • For all trades with KCGA, the platform self-clears • Only trade counterparties are privy to order details, other axed participants receive basic information (size, CUSIP, price) of trade away from them occurring on the platform
	Fee Structure	<ul style="list-style-type: none"> • Platform charges non-negotiable subscription and transaction fees: <ul style="list-style-type: none"> – Subscription fees: Platform charges various subscription fees to participants depending on their method of connectivity – Transaction fees: Single sided fee based on asset class and bond type and is billed to the liquidity provider at the end of the month <ul style="list-style-type: none"> ▪ Liquidity Providers, i.e., participants posting resting orders, quoted markets and RFQ respondents pay transaction fees ▪ Liquidity Takers, i.e., participants initiating RFQs and hitting/lifting quoted markets, do not pay transaction fees ▪ Trades in which KCGA acts as riskless principal may involve a fee or other remuneration to facilitate KCGA’s clearance and settlement costs • Data fees/Additional service fees: Yes; Fees for market data feeds included in the various subscription options and for other technology user interfaces • Incentives/Rebates: No

KCG BondPoint – Platform Risk, Reporting, and Compliance

Topic	Details
Platform Risk, Reporting, and Compliance	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Dealers select which markets and participants they trade in and with, respectively – Global kill switch: Yes; Platform can cancel all open orders and suspend trading on the platform. Participants also have the capability to cancel all of their open orders Participant imposed limits: Yes; participants have capability to impose restrictions at user-level
	<ul style="list-style-type: none"> Best execution analysis/TCA: Yes; tools available to assist in best execution evaluation
	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: Participants must be institutional investors, or registered Broker Dealers, and follow criteria established by KCG to trade on the platform, as well as any security-specific criteria for eligibility (e.g., QIB to trade 144a securities) KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: N/A; KCG self-clears Platform participants are notified of new subscribers on the platform
	<ul style="list-style-type: none"> Abusive trading practices and monitoring capabilities: Monitored Off-market trade review, erroneous trade policy, trade dispute: Platform has an erroneous trade policy and handles disputes on a case-by-case basis
	<ul style="list-style-type: none"> BondScope, customizable surveillance tool, to provide pre-trade and post-trade transaction review and oversight. Point of Sale validation and documentation capabilities for broker workstation users Order validations available to enforce minimum denominations, negative yields, etc.

KCG BondPoint – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Web-based interface Supports FIX 4.4 messaging, FAST protocol, and provides API
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Integrates with several OMS/EMS as well as middle and back office systems Provides STP to Dealers and/or clearing partners Provides connectivity to third party reference data content Private label services: Yes; Platform provides white label services Bid-list processing: Yes
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: In-house Secondary system: Yes, KCG runs live-live between primary/secondary data centers. Disaster recovery located in secondary location
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Technology and Integration: <ul style="list-style-type: none"> Plans to integrate with additional OMS Products and Participants: <ul style="list-style-type: none"> Expanding on protocol types and order types geared towards Buy-Side participants
	Additional Notes and Comments	<ul style="list-style-type: none"> None



Liquidity Finance: Liquidity Flow Platform Details

Liquidity Flow

Phone: 203.883.8950

Address: One Station Place, 5th Floor, Stamford, CT, 06902

Parent Firm	Platform Type	Product(s)	Category
Private – Independent	All to All	Emerging Market Debt	Operational Trading Platform

Platform Overview

Liquidity Finance (“LF”) has a web-based electronic trading platform called Liquidity Flow that specializes in round-lot trading for Emerging Market Debt securities, both Sovereigns and Corporates. Liquidity Flow is used by Buy-Side and Dealer participants around the world, with a majority from the UK and North America.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: Liquidity Finance LLP (UK entity), founded in December 2008 • Platform entity: Liquidity Finance LP (US entity), platform launched in 2011 • FTE: 26 total; Split between 20 Brokers and 6 employees in IT, Operations, and Legal • MPID: N/A
	Type of Platform <ul style="list-style-type: none"> • Platform category: Two protocols (1) Continuous Auction (LOB/CtT) and (2) Live Auctions (Matching Sessions Real-Time Matching) • All to All platform that is fully anonymous
	Target Participants <ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants • Number of participants: ~407; ~45-50% of clients are based in UK and ~35-40% are based in North America. • ~30% are Dealers and ~70% are Buy-Side participants • Number of active participants: All 407 participants
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: Emerging Fixed Income markets (North American, European, Latin American, and Asian) • Product(s) traded: Emerging Market Bonds (Sovereigns and Corporate Bonds) • Trade size(s): Round lot
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • ATS registered and entity: Yes; Liquidity Finance LP • Registered Broker Dealer and entity: Yes; Liquidity Finance LP • Regulator(s): FINRA, SEC, and FCA (Liquidity Finance LLP) • Other licenses: None
	Other Services <ul style="list-style-type: none"> • Other chargeable data services/add-ons: None • Treasury spotting capabilities: None • Treasury hedging capabilities: None

Liquidity Flow – Platform Characteristics (1/2)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>Platform facilitates two types of trading protocols: Continuous Auction (LOB/CtT) and two Live Auctions daily (Matching Sessions) to allow participants from all regions to trade securities from several regions of Emerging Markets. For both protocol types, Liquidity Flow provides the initial suggested mid-point price (MP) for all the securities that are listed; this price is calculated by aggregating multiple sources of price data</p> <ul style="list-style-type: none"> • Continuous Auction (LOB/CtT) <ul style="list-style-type: none"> – The Continuous Auction runs from 5:00 AM – 11:00 PM GMT and includes all of securities that trade on the platform – Participants can demonstrate interest in a security by two methods: <ul style="list-style-type: none"> ▪ Participant can input an order (including direction and size) to trade at the MP set by the platform ▪ Participant can input an indication away from the MP by requesting a change to the MP. The price change will only take place if a bid or an offer is also made simultaneously and the price is improved (meaning that the spread is made tighter) – Participants have full depth of book – All unfilled orders/indications are cancelled at the end of the day • Live Auctions (Matching Sessions – Real-Time Matching) <ul style="list-style-type: none"> – The two daily Live Auctions are focused on a limited number of securities from overlapping markets. LF selects ~700 securities to be traded for each regional session. The 9:30 AM GMT Live Session is focused on European and Asian securities and the 3:00 PM GMT Live Session is focused on European, North American, and Latin American securities. Each session runs for 30 minutes of real-time matching, and facilitate the same trading methodology – Participants can demonstrate interest in a security by two methods: <ul style="list-style-type: none"> ▪ Participant can input an order (including direction and size) to trade at the MP set by the platform ▪ Participant can input an indication away from the MP by requesting a change to the MP. The price change will only take place if a bid or an offer is also made simultaneously and the price is improved (meaning that the spread is made tighter) – All unfilled orders/indications are canceled at the end of each session – Once a trade is matched in either trading protocol, both counterparties are notified and are required to confirm via Bloomberg's Voice Connection Platform (VCON)
	Price Formation and Transparency	<ul style="list-style-type: none"> • Participants have the ability to access data for any trades they have executed on the platform by entering the appropriate date into the system • Both trading protocols displays the current MP, all open orders at the MP, and all open orders at suggested MP prices for all securities to all participants
	Counterparty Protocol	<ul style="list-style-type: none"> • Only trade counterparties are privy to order details, while other participants can only see the security traded on the platform • Matching counterparties are notified and are required to confirm via Bloomberg's Voice Connection platform (VCON) in order to execute the trade. LF monitors the confirmation process and resolves any potential issues as they arise • LF acts as the riskless counterparty to buyers and sellers of all trades on the platform • All UK and Dubai trades are cleared through Pershing UK and all US trades are cleared through Pershing US

Liquidity Flow – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Fee Structure	<ul style="list-style-type: none"> • Platform charges non-negotiable transaction fees: <ul style="list-style-type: none"> – Fees are dual-sided with a mark-up and mark-down, and are based on a fixed basis point on notional value per executed trade – Transaction fees are included in the price of the trade • Data fees/Additional service fees: None • Incentives/Rebates: None

Liquidity Flow – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> • Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (on-boarded entities) and at the trader level – Access: Each individual trader has their own login to access the platform – Orders can only be entered in \$1mm increments (up to the total order size) • Global kill switch: Yes; Platform can cancel all open orders at the platform-level. In addition, participants on the platform can cancel a single order and/or all orders by clicking an “X” button in the “Status” column. If the “X” is pressed after a partial fill, platform will only cancel the unfilled portion of the trade • Participant imposed limits: Yes; Participants have individually established trading limits when on-boarded to the platform
	Client Reporting Capabilities	<ul style="list-style-type: none"> • Best execution analysis/TCA: None
	Subscriber Eligibility	<ul style="list-style-type: none"> • Specific criteria for subscriber eligibility: Each potential participant is assessed on a case-by-case basis • KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> • Abusive trading practices and monitoring capabilities: Monitored • Off-market trade review, erroneous trade policy, trade dispute: <ul style="list-style-type: none"> – Platform has a Terms of Agreement that defines its trading policy – In case of a dispute, Liquidity Finance attempts to settle a dispute in the most amicable way possible for both parties involved
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> • None

Liquidity Flow – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Liquidity Flow is self-hosted and web-based in HTML format Liquidity Flow does not allow for external connectivity to the platform
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: All confirmations are done through Bloomberg Bid-list processing: N/A
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Owned hardware Secondary system: Yes; Backup sites for redundancy that can be accessed when needed, with an expected recovery time of 24-48 hours
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Technology and Integration: <ul style="list-style-type: none"> Improve the efficiency of databases and bring them in-line with Big Data concepts for the future Products and Participants: <ul style="list-style-type: none"> Plan is to further enhance the capabilities of Emerging Market trading on Liquidity Flow
	Additional Notes and Comments	<ul style="list-style-type: none"> None



Liquidnet Dark Pool Platform Details

Liquidnet Dark Pool

Phone: 646.674.2000

Address: 498 7th Ave, New York, NY

Parent Firm	Platform Type	Product(s)	Category
Private – Independent	Buy-Side to Buy-Side and Dealer to Buy-Side	Global Corporate Bonds	Operational Trading Platform

Platform Overview

Liquidnet Inc. is a global institutional trading network that historically operated in the Equities space. The company entered the Global Fixed Income market with the acquisition of corporate bond platform operator Vega-Chi Limited in 2014 and subsequent launch of Liquidnet Fixed Income Dark Pool (“Liquidnet FIDP”) in September 2015. The Dark Pool allows for two types of anonymous matches with different characteristics: Buy-Side to Buy-Side and Buy-Side to Dealers.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: Liquidnet Holdings, Inc., founded in 1999 • Platform entity: Liquidnet, Inc. (“Liquidnet”), platform Liquidnet FIDP launched September 2015 • FTE: ~16 total dedicated to Fixed income; Platform leverages parent infrastructure for support (300+ employees) • MPID: LQNF
	Type of Platform <ul style="list-style-type: none"> • Platform category: Dark Pool • Buy-Side to Buy-Side and Dealer to Buy-Side platform that is fully anonymous
	Target Participants <ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants • Number of participants: 270 total • Number of active participants: 260 total
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: US, and other Developed and Emerging Fixed Income Markets (focused on European) • Product(s) traded: US and European HY and IG Corporate Bonds, Emerging Market Corporate Bonds, and European Convertibles (registered and unregistered 144a) • Trade size(s): Round lot and block; minimum trade size: \$101k
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • ATS registered and entity: Yes; Liquidnet, Inc. • Registered Broker Dealer and entity: Yes; Liquidnet, Inc. • Regulator(s): FINRA and SEC • Other licenses: None
	Other Services <ul style="list-style-type: none"> • Other chargeable data services/add-ons: None • Treasury spotting capabilities: Yes; via third-party Treasury price data • Treasury hedging capabilities: Yes; executed via Goldman Sachs

Liquidnet – Platform Characteristics (1/2)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>The Dark Pool platform allows for two types of anonymous matches for Buy-Side and Dealer participants:</p> <ul style="list-style-type: none"> • Buy-Side to Buy-Side trades <ul style="list-style-type: none"> – Buy-Side participants enter passive non-displayed IOIs including CUSIP and size (with the option to include minimum size) and no price details – Indications are not visible to anyone; When there is a match the two sides are alerted that there is a contra interest – Indications are matched by size and time priority, with a focus on maximize trade volume – Upon matching, the two Buy-Side participants are given five minutes to accept an invitation to negotiate – During a negotiation, the two sides are firm to each other and can change their price during the negotiation process – If both counterparties do not enter into the negotiation or cannot finalize the price, the next closest counterparty (if there is one for that security) according to the priority matching logic will be notified in order to start a negotiation. Other participants on the platform are not notified of matches • Dealer to Buy-Side trades <ul style="list-style-type: none"> – Dealers can only submit firm and executable orders that include CUSIP, price, and size into the Dark Pool that can only be matched to Buy-Side IOIs. The Dealer does not have visibility into the Dark Pool while the matching Buy-Side participant can see the Dealer’s firm order – Upon matching, the Buy-Side participant has the ability execute at the Dealer’s price or initiate a bilateral negotiation with the Dealer – Dealers will only be notified of trade execution or if there is a bilateral negotiation request from the Buy-Side
	Price Formation and Transparency	<ul style="list-style-type: none"> • Each trading protocol has its own level of price transparency: <ul style="list-style-type: none"> – Buy-Side to Buy-Side trades <ul style="list-style-type: none"> ▪ Price is not included as part of the IOI. Prices are negotiated bilaterally after the CUSIP and size match ▪ In the bilateral negotiation, prices are firm and are disclosed to the matching counterparties once each counterparty enters a price ▪ Price improvements in the negotiation are immediately shown to the opposing counterparty – Dealer to Buy-Side trades <ul style="list-style-type: none"> ▪ Dealer prices are only visible to Buy-Side participants that have matching IOI ▪ Dealers are notified of either a trade execution or a request to negotiate. Negotiation protocol is the same as Buy-Side to Buy-Side trading
	Counterparty Protocol	<ul style="list-style-type: none"> • Only trade counterparties are privy to their order details, while other participants only see price information on TRACE, if securities are TRACE-eligible, following publication of the trade • Liquidnet acts as the riskless counterparty to buyers and sellers of all trades on the platform • All trades are cleared and settled through Goldman Sachs Execution and Clearing LP (“GSEC”)

Liquidnet – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Fee Structure	<ul style="list-style-type: none"> • Platform charges non-negotiable transaction fees that are based on participants of the trade and security type: <ul style="list-style-type: none"> – Trade participants: <ul style="list-style-type: none"> ▪ Buy-Side to Buy-Side: Fees are dual-sided with a mark-up and mark-down that is included in the trade price ▪ Dealer to Buy-Side: Single-sided with a mark-up or mark-down, where only Buy-Side pays – Security type: <ul style="list-style-type: none"> ▪ HY is 0.03 to 1/16 (in bond price terms) ▪ IG ranges from 0.3-1 bps depending on maturity • Data fees/Additional service fees: None • Incentives/Rebates: Yes; Dealers do not pay transaction fees for providing firm/executable liquidity

Liquidnet – Platform Risk, Reporting, and Compliance

Topic	Details
Platform Risk, Reporting, and Compliance	<ul style="list-style-type: none"> • Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning is controlled at the firm level, trader desk level, and/or individual trader level – Platform has controls for each security to prevent submissions of off-market orders and prevent fat finger errors (by price and size) – Platform has the ability to block participants from trading in a security for a day if they are not acting as good market participants (e.g. if the participant matches with someone and negotiates but repeatedly does not trade) – Liquidnet has credit limits on the platform • Global kill switch: Yes; Platform can cancel all open orders at the platform, participant, and security level. In addition, Dealers can cancel all of their open orders prior to execution • Participant imposed limits: Yes; Clients can set trading limits and permission participants differently. Clients select their minimum default size for a negotiations from a choice of \$101K, \$250K, \$500K, \$1mm, \$2mm, \$5mm (for IG only)
	<ul style="list-style-type: none"> • Best execution analysis/TCA: Yes via pre-trade evaluated price data from Interactive Data Corporation (“IDC”) and Markit. Liquidnet provides a pre-trade best composite bid/offer based on the evaluated price data from IDC and Markit. The best execution/TCA reports per trade or in aggregate for the user over any time period are accessible by the user via the User Interface. Liquidnet can also generate periodic best execution and TCA reports per firm or user • Liquidnet FIDP provides a variety of data and reports to facilitate pre-trade and post-trade analyses: <ul style="list-style-type: none"> – Licensing agreement with IDC for continuous evaluated pricing to aid in pre-trade transparency and more efficient best execution analyses – Licensing agreement with Markit for inclusion of their intra-day evaluated pricing to aid in pre-trade transparency and more efficient best execution analyses – Credit index and single name CDS prices from Markit – IDC and Markit data feeds are included for participants • Liquidnet FIDP provides real time TRACE data and analytics to its users via the platform user interface
	<ul style="list-style-type: none"> • Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Participants on the platform must have minimum AUM of \$100mm • KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes; with GSEC
	<ul style="list-style-type: none"> • Abusive trading practices and monitoring capabilities: Monitored by internal surveillance team • Off-market trade review, erroneous trade policy, trade dispute: Yes; Platform has dispute policies • Participants have the ability to block another participant from trading with them on the platform on a specific bond for 30 minutes or the rest of the day following a failed negotiation on a specific bond (without knowing who the other side is)
	<ul style="list-style-type: none"> • None

Liquidnet – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Client installed desktop software Supports FIX 4.2 and 4.4 messaging and Excel uploads
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Integrates with 7 OMS/EMS that support direct connectivity Participants have the option to connect their OMS to Liquidnet, in order to enable a full sweep of the participants' blotter Provides STP to GSEC Bid-list processing: No; However, participants have several methods to enter bulk orders simultaneously (e.g., paste from Excel, a full sweep from their OMS)
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Owned hardware; Located in New Jersey Secondary system: Yes; Located in Virginia
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Products: <ul style="list-style-type: none"> To be publicly disclosed later in H1 2016
	Additional Notes and Comments	<ul style="list-style-type: none"> Liquidnet also offers an All to All limit order book ("Lit Pool") for US Corporate Bonds (acquired from Vega-Chi in March 2014) that was not included in the scope of this survey. This protocol allows participants to see the prices and sizes of all offers (more than just the best bid) and all orders are firm and executable



MarketAxess Platform Details

MarketAxess

Phone: 212-813-6000

Address: 299 Park Ave, 10th Floor New York, NY 10171

Parent Firm	Platform Type	Product(s)	Category
Public	Varied by Protocol	Corporate Bonds (HY and IG)	Operational Trading Platform

Platform Overview

MarketAxess Holdings Inc. was initially formed as a trading platform for credit products and now provides trading, market data, and technology solutions for many security types to Buy-Side and Dealer participants globally. MarketAxess facilitates trading in Corporate Bond (amongst other product types), offering both an E-RFQ and LOB/QS on a disclosed basis and anonymous basis.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: MarketAxess Holdings Inc., founded in 2000 • Platform entity: MarketAxess Corporation, platform launched in 2012 • FTE: 342 total • MPID: MKTX
	Type of Platform <ul style="list-style-type: none"> • Platform category: Platform offers multiple trading protocols, two are related to US Corporate securities: <ul style="list-style-type: none"> – E-RFQ: (a) Buy-Side to Dealer trades on a disclosed basis (b) Market Lists: All-to-All trades on an anonymous basis – LOB/QS (Axes): (a) Facilitates Buy-Side to Dealer trades on a disclosed basis, and (b): All-to-All trades on an anonymous basis
	Target Participants <ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants • Number of total participants: 1,090 total; 1,000 Buy-Side and 90 Dealer • Number of active participants: ~1000 participants are active
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: US, and other Developed and Emerging Fixed Income markets • Product(s) traded: Trades US IG and HY Corporate Bonds, (registered, unregistered 144a, and Reg-S), US Agency Securities, Eurobonds, Emerging Markets (Corporates and Sovereigns), CDS, Asset Backed Securities, convertibles, and preferred securities • Trade size(s): All sizes
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • ATS registered and entity: Yes; MarketAxess Corporation • Registered Broker Dealer and entity: Yes; MarketAxess Corporation • Regulator(s): FINRA and SEC
	Other Services <ul style="list-style-type: none"> • Other chargeable data services/add-ons: <ul style="list-style-type: none"> – Provides fixed-income market data, analytics and compliance tools that help clients make trading decisions – Provides technology solutions to Fixed Income industry participants – Trax: pre-post trade services, provides trade matching and regulatory transaction reporting services – MarketAxess BondTicker™: provides Corporate Bond market data to the industry, and is the exclusive data provider to the WSJ, launched in 2002 • Treasury spotting capabilities: Yes, performed in-house • Treasury hedging capabilities: Yes, performed in-house

MarketAxess – Platform Characteristics (1/2)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>Platform offers two main trading protocols for US Corporate securities; an E-RFQ, and LOB/QS (Axes). Trading Hours are from 7PM-6PM EST (23 hours). Protocols are detailed as follows:</p> <ul style="list-style-type: none"> • E-RFQs <ul style="list-style-type: none"> – The protocol allows for (a) Dealer to Buy-Side trading on a disclosed basis and (b) via Market Lists, All-to-All trading on an anonymous basis – Initiator submits CUSIP, size, and determines recipients: <ul style="list-style-type: none"> ▪ Disclosed: Participants can select pre-established Dealer relationships on a disclosed basis ▪ Anonymous: Participants can choose Market Lists to send to all, or to specific groups of participants, on a fully anonymous basis ▪ Both: Participants can select Dealer relationships (on a disclosed basis) and also send RFQ to Market List groups (anonymous) simultaneously – Participants can select ASAP (all responses will appear on participant screen as they come) or Bin (all responses come at once at a specified time – not applicable for HY) – Responders can submit live and executable quotes and include a specified good-till time, at which point the quote expires. Offers the option to negotiate as well – Depending on if the RFQ is ASAP or Bin, the initiator can respond to quotes prior to expiration or at expiration and execute at selected level • LOB/QS - Axes <ul style="list-style-type: none"> – The Axes protocol allows participants the option to enter indications/orders either on a disclosed basis to Dealers they have an existing relationship with, and/or enter indications/orders anonymously on an All-to-All basis (participants can enter both order types simultaneously) – Participants can enter resting orders with the following information CUSIPs, direction, size, minimum size, and price/spread – Protocol allows for participants to counter and negotiate submitted prices/spreads • Additional Functionality: <ul style="list-style-type: none"> – Bulk Orders: Participants can bulk-upload orders through the MarketAxess’s Axe contributor functionality. When a participant uploads their orders, they can adjust them within MarketAxess and send out through RFQ and Axes protocols – Watch-list/Alerts: If a participant is not getting the desired level on a security, they can add the security to a watch-list, which will then alert the participant if there is opposing interest in a bond. When the alert comes in, participants can enter size and level to enter into a firm bid or offer – List Trading: Functionality that provides participants the ability to place RFQs/orders on multiple bonds simultaneously – 2-way quotes (Swap trading): Participants can enter two-sided RFQs/orders where both sides must execute simultaneously and payments are based on price-differential of the two securities – Star rating: A 5-star rating system based on the amount of times a participant cancels an RFQ/order within the system. Participants can filter to show specified star ratings

MarketAxess – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Price Formation and Transparency	<ul style="list-style-type: none"> • Pre-Trade: Provides participants with real-time and historic trade price information, liquidity, and turnover analytics • Level of price transparency varies by trading protocol and level of disclosure: <ul style="list-style-type: none"> – RFQ (Disclosed and Market List): Winning responder is notified and cover price is also disclosed. Cover bidder is only notified that they were the cover – Axes (Disclosed): Only trade counterparties are privy to price information – Axes (Open Markets): Participants are able to see a list of indications from all responders, who remain anonymous
	Counterparty Protocol	<ul style="list-style-type: none"> • Only trade counterparties are privy to trade details, while other participants can only see completed trade information on TRACE, for TRACE-eligible securities • In anonymous All to All trading (Market Lists and Open Markets together known as Open Trading), trading counterparties are anonymous from trade through execution. MarketAxess will act as the riskless counterparty to buyers and sellers of these trades, and all trades are cleared and settled through Pershing • In disclosed RFQ and disclosed Axes, trading counterparties are disclosed, trades are settled off the platform between the participants
	Fee Structure	<ul style="list-style-type: none"> • Platform charges fees that are based on trade type and product type: <ul style="list-style-type: none"> – For IG there are two fee plans, either: <ul style="list-style-type: none"> ▪ Dealers pay a monthly distribution fee plus a transaction fee for every trade, or ▪ Dealers pay a transaction fee for every trade and an additional per-trade execution fee – For HY: Dealers pay a transaction fee for every trade • Data fees/Additional service fees: No additional charges for data feeds. Value added data services are available if required but not mandatory • Incentives/Rebates: None

MarketAxess – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (on-boarded entities), desk level, trader level, and bond level Global kill switch: Yes, Platform can cancel all open orders at the platform, order, trader, and CUSIP level. In addition, participants have ability to cancel all of their open orders on an order-basis. If a participant cannot cancel all open-orders in time, MarketAxess has capability to cancel orders post-trade Participant imposed limits: Yes, participants can impose limits at the trader and security type level
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: Yes, TCA reports offered to all active clients at no charge
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: Participants must be a QIB KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes, with Pershing
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices and monitoring capabilities: Monitored Off-market trade review, erroneous trade policy, trade dispute: Yes, Platform has an erroneous trade policy in place
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

MarketAxess – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Client installed desktop software Supports FIX 4.2, FIX 4.4 and FIX 5.0 messaging, XML, FXML, and provides API
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: Provides STP to clearing partner Bid-list processing: Yes, has patented electronic bid and offer list technology
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: In-house Secondary system: Yes; Located in New Jersey and Virginia
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Products and Participants: <ul style="list-style-type: none"> Expanding data service offering provided by Trax in Europe, with additional content related to trading, volume, and pricing Planning on expanding into Municipal Bond trading in Q1/Q2
	Additional Notes and Comments	<ul style="list-style-type: none"> None



MTS BondsPro Platform Details

MTS BondsPro

Phone: 212.257.4062

Address: 14 Wall Street, Suite 4G, New York, NY 10005

Parent Firm	Platform Type	Product(s)	Category
Public	All to All	Corporate Bonds (HY and IG)	Operational Trading Platform

Platform Overview

MTS BondsPro is an electronic trading platform that is majority owned by the London Stock Exchange Group. The platform features a LOB/QS/CtT for Corporate Bonds and Emerging Market Debt (both Corporates and Sovereigns). The platform provides Buy-Side and Dealer participants the option to submit orders that are either firm and executable or subject on the same order book.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: London Stock Exchange Group plc. (“LSEG”), inclusive of subsidiary Borsa Italiana SpA and MTS SpA • Platform entity: MTS Markets International Inc. (“MMI”), platform was acquired from Bonds.Com Group Inc. in May 2014 • FTE: Not disclosed • MPID: BNDS
	Type of Platform <ul style="list-style-type: none"> • Platform category: LOB/QS/CtT • All to All platform that is fully anonymous • Volume distribution: ~50% Dealer to Dealer, ~40% Dealer to Buy-Side, ~10% Buy-Side to Buy-Side
	Target Participants <ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants • Number of participants: 700 entities onboarded; ~400 Buy-Side and ~300 Dealers • Number of active participants: Not disclosed
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: US and Emerging Fixed Income Markets • Product(s) traded: HY and IG US Corporate Bonds (registered and unregistered 144a), Emerging Debt (both USD-denominated Corporate and Sovereign Bonds) • Trade size(s): All sizes, primarily odd lots
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • ATS registered and entity: Yes; MTS Markets International Inc. • Registered Broker Dealer and entity: Yes; MTS Markets International Inc. • Regulator(s): FINRA and SEC • Other licenses: None
	Other Services <ul style="list-style-type: none"> • Other chargeable data services/add-ons: Yes; MTS provides price and spread data for applicable securities • Treasury spotting capabilities: Yes; Performed in-house • Treasury hedging capabilities: None

MTS BondsPro – Platform Characteristics

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>MMI's platform hosts a continuous All to All LOB/QS/CtT that offers participants anonymous access to trading of more than 13,000 securities. Trading hours are from 7:00AM to 5:00PM EST, Monday through Friday. Orders are live during the day unless cancelled by the participant</p> <ul style="list-style-type: none"> • Orders are cancelled at end of day and must be reinstated by the participant at the start of the next day. This can be automatic or manual at the participant's discretion • Participants can place resting limit orders anonymously to the order book throughout the trading day • Participants input the direction, spread or price, and size for each order. Participants also must indicate: <ul style="list-style-type: none"> – Confirmation type: Subject (participant has a last look) or Firm (immediately executable): <ul style="list-style-type: none"> ▪ When a Subject order is matched, a confirmation request is sent to the counterparty prior to execution. Counterparty has two minutes to respond, otherwise, order will not be executed and will be re-submitted to the order book ▪ When a Firm order is matched, the trade is executed ▪ Majority of the orders on the platform are Subject (the default confirmation type) – Fill type: All-or-None or Partial Fill (with a defined minimum and option to keep the residual active) • An aggressing participant has the option to hit or lift an order and specify a size between the minimum and full size of the resting order • To encourage good market behavior, platform generates and displays a color-coded rating for each participant based on how often the participant executes a subject order versus cancelling the order
	Price Formation and Transparency	<ul style="list-style-type: none"> • The order book is lit and shows the full depth of the market • All participants can see the price or spread and size of all orders in the book without participant disclosure
	Counterparty Protocol	<ul style="list-style-type: none"> • Only trade counterparties are privy to order details, while other participants can only see price information on TRACE, for TRACE-eligible securities • MMI acts as the riskless counterparty to buyers and sellers of all trades on the platform • All trades are cleared and settled through Pershing
	Fee Structure	<ul style="list-style-type: none"> • Platform charges non-negotiable transaction fees: <ul style="list-style-type: none"> – Fees are single-sided with a mark-up or mark-down and are based on security type: <ul style="list-style-type: none"> ▪ Liquidity providers, i.e., participants posting resting orders, do not pay transaction fees ▪ Liquidity takers, i.e., participants hitting bids, lifting offers, pay transaction fees – Transaction fees can be included in the trade price or can be sent as a separate invoice at the end of the month • Data fees/Additional service fees: None • Incentives/Rebates: None

MTS BondsPro – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities), desk level, and trader level – Access: Each participant has an individual login to access the platform – MTS BondsPro sets credit limits for each participant for (a) total daily limit and (b) single order limits. These limits can be set at the firm and trader level. The system generates a warning notification if the participant’s order significantly deviates from the participant’s normal activity – MTS monitors and will flag participants that are manipulating the system to avoid paying transaction fees Global kill switch: Yes; Platform can cancel all open orders at the platform, participant, and security level. In addition, participants have the ability to cancel single, desk, or all open orders prior to execution Participant imposed limits: Yes; Each participant can set limits for multiple sub-groups, including CP, desk, and trader
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: None Platform provides a trade blotter
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: All participants must be a QIB, accredited investor, or registered Broker Dealer KYC/AML procedures <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes, with Pershing
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices/monitoring capabilities: Monitored <ul style="list-style-type: none"> – Participants with low fill rates are flagged and can be barred from trading Off-market trade review/erroneous trade policy/trade dispute: <ul style="list-style-type: none"> – MMI reviews and determines trade disputes on a case-by-case basis – Participant must request a cancellation from MMI by telephone within 15 minutes of the execution in question. Once a request is made, MMI will review all relevant factors to determine if it is clearly erroneous
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

MTS BondsPro – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Web-based interface Supports FIX 4.4 messaging and provides API
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Integrates with several OMS/EMS Provides STP to clearing partner Pershing Provides ability for participants to have customized integration and views Bid-list processing: N/A
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Third party servers; Hosted by InterDealer (also the vendor and developer of platform's technology) Secondary system: Yes, Hosted by InterDealer
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Technology and Integration: <ul style="list-style-type: none"> Plans to expand methods of connectivity to the platform Products and Participants: <ul style="list-style-type: none"> Plans to introduce trading in non-USD Corporate Bonds in Q1 2016
	Additional Notes and Comments	<ul style="list-style-type: none"> None



NYSE Bonds Platform Details

NYSE Bonds

Phone: 888.689.7739

Address: 11 Wall St, New York, NY 10005

Parent Firm	Platform Type	Product(s)	Category
Public	Dealer to Dealer	Corporate Bonds (HY and IG)	Operational Trading Platform

Platform Overview

NYSE Bonds is a registered electronic exchange that leverages the infrastructure of the New York Stock Exchange (“NYSE”) and NYSE Arca to facilitate trading of NYSE listed Corporate Bonds. The platform offers live pricing for over 3,000 securities and averages over 4mm price updates a day. The NYSE Bonds platform lets subscribers interact directly with the marketplace through a limit order book and offers full order book visibility.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> Parent name: Intercontinental Exchange Inc. (“ICE”), founded in 2000 <ul style="list-style-type: none"> Platform is a subsidiary New York Stock Exchange (NYSE), founded in 1817 Platform entity: NYSE Bonds, platform launched in 2007 FTE: 3 total; Split between Sales, Client Integration, and Business Analyst. The platform leverages parent infrastructure for support MPID: N/A
	Type of Platform <ul style="list-style-type: none"> Platform category: Lit Order Book Dealer to Dealer and fully anonymous for Continuous Net Settlements (“CNS”) eligible securities, but partial anonymous for non-CNS eligible securities
	Target Participants <ul style="list-style-type: none"> Primarily targets retail order flow routed from Dealers Number of participants: 30 Dealers Number of active participants: 15 Dealers
	Product and Market Focus <ul style="list-style-type: none"> Product geography: Primarily US Fixed Income markets Product(s) traded: HY and IG Corporate Bonds Trade sizes(s): Micro lot and odd lot trades
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> ATS registered and entity: No Registered Broker Dealer and entity: No Regulator(s): FINRA and SEC Other licenses: NYSE is registered as an Exchange
	Other Services <ul style="list-style-type: none"> Other chargeable data services/add-ons: None Treasury spotting capabilities: None Treasury hedging capabilities: None

NYSE Bonds – Platform Characteristics

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>The NYSE Bonds platform is a Lit Order Book with live and executable orders and full visibility</p> <ul style="list-style-type: none"> • Trading hours are from 4:00AM-8:00PM EST, Pre-Opening Session is at 3:30AM (when limit orders can be pre-entered) • Subscribers can enter two types of orders: <ul style="list-style-type: none"> – Limit: An order to buy or sell a stated amount of bonds at a specified price or improved. Subscribers can set an expiration time for the order: end of trading day, good till cancelled, and good till specified date – Reserve: A limit order which displays a portion of the total order size, with a reserve portion of the size not displayed (similar to an “iceberg” order). For a group of buy and sell side orders with the same price, the displayed order sizes will be filled before non-displayed reserve order sizes • Orders in the Limit Order Book are matched on a strict price and then time priority basis
	Price Formation and Transparency	<ul style="list-style-type: none"> • NYSE Bonds show trade and order data in three separate feeds to all subscribers, from 3:30AM – 8:00PM EST: <ul style="list-style-type: none"> – NYSE Bonds Depth of Book: Live and executable bids and offers in the Limit Order Book – NYSE Bonds BBO: Real-time view of the top of the book – NYSE Bonds Trades: Real-time last sale prices and sizes • Dealers can choose to give clients visibility to the platform and orders are still routed through the Dealer
	Counterparty Protocol	<ul style="list-style-type: none"> • All trades on NYSE bonds are Inter-Dealer • All trades are cleared through clearing members of the NSCC, and Dealers face each other directly • Bonds are cleared in two ways: <ul style="list-style-type: none"> – Continuous Net Settlements (“CNS”, a subsidiary of the DTCC) eligible bonds: NYSE Bonds compares trade details and submits trade details to CNS on behalf of trade counterparties. Trades are fully anonymous – Non-CNS eligible (Ex-Clearing Bonds): NYSE Bonds provides trade counterparties with an execution package for the trade for the trading parties to clear the trade between them. Counterparties are anonymous until the execution package is sent to the counterparties • Trades on NYSE Bonds are not reported to TRACE because trades executed on NYSE Bonds are exempt
	Fee Structure	<ul style="list-style-type: none"> • NYSE Bonds charges non-negotiable subscription and transaction fees: <ul style="list-style-type: none"> – Subscription fees: <ul style="list-style-type: none"> ▪ General licensing fee is \$40k/year (to access all NYSE products) and only needed if subscriber intends on trading equities and options in addition to bonds ▪ NYSE Bond-only member (Bond Trading License): Waived licensing fee and application fee; Annual \$500/year regulatory fee – Transaction fees: <ul style="list-style-type: none"> ▪ Fees are single-sided for the liquidity taker and are based on the number of bonds in a transaction <ul style="list-style-type: none"> • Executions of 1 to 10 bonds, \$0.50 each; 11-25 bonds, \$0.20 each; 26+ bonds, \$0.10 each • Execution fees are maximum \$100 per trade execution • All fees are billed to the subscriber on a monthly basis • Data fees/Additional service fees: None • Incentives/Rebates: None

NYSE Bonds – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: NYSE controls permissioning at the subscriber level (subscribers represent Dealers on the platform) – Participant logins: Dealers route orders directly from OMS to the platform via FIX 4.0 – There are no credit limits on the platform, but subscribers are vetted as NYSE members and undergo a membership review performed by FINRA Global kill switch: Yes; Platform can cancel all open trades at the platform, subscriber, and security level. In addition, subscribers can cancel orders via FIX or call NYSE Bonds Participant imposed limits: None
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: None
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Subscribers on NYSE Bonds are members of NYSE or are directly onboarded to NYSE Bonds KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house; Outside reviews/audits are performed by FINRA – Clearing firm onboarding and procedures: Yes; Subscribers must be self-clearing members of NSCC
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices/monitoring capabilities: Monitored <ul style="list-style-type: none"> – NYSE Bonds has a platform surveillance team, and an established trade practices rule set Off-market trade review/erroneous trade policy/trade dispute: <ul style="list-style-type: none"> – NYSE trade desk can cancel a trade if it is clearly off market or erroneous – Subscribers have the option to bring a claim to arbitration
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

NYSE Bonds – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Platform is only accessible via FIX 4.0 messaging NYSE FIX Gateway to NYSE Arca
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Integrates with several OMS/EMS via FIX 4.0 InterDealer IT Bloomberg TOMS, ETOMS Bid-list processing: N/A
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems : Yes <ul style="list-style-type: none"> Primary system: Owned hardware; Located in Mahwah, NJ Secondary system: Yes; Located in Chicago, IL
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Platform is unable to disclose future enhancements due to regulatory reasons
	Additional Notes and Comments	<ul style="list-style-type: none"> None



OpenBondX Platform Details

OpenBondX

Phone: 800.986.2142

Address: 925 Arthur Godfrey Rd, #103, Miami Beach FL 33140

Parent Firm	Platform Type	Product(s)	Category
Private – Independent	All to All	Corporate Bonds (HY and IG)	Operational Trading Platform

Platform Overview

OpenBondX is an electronic trading platform that currently trades Corporate Bonds. The platform hosts a trademarked matching protocol that functions similarly to the traditional RFQ, called RFFQ (Request for Firm Quote).

Topic		Details
Platform Summary	Corporate Structure & Additional Details	<ul style="list-style-type: none"> • Parent name: OpenBondX, LLC, founded in August, 2012 • Platform entity: OpenBondX, LLC, platform launched in September 2015 • FTE: 9 total; Split between technology, development, and support, with 1 dedicated salesperson and several consultants for marketing and other functions • MPID: OBPX
	Type of Platform	<ul style="list-style-type: none"> • Platform category: E-RFQ • All to All platform that is fully anonymous
	Target Participants	<ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants • Number of participants: N/A – platform has recently launched and therefore has limited metrics • Active participants: N/A – platform has recently launched and therefore has limited metrics
	Product and Market Focus	<ul style="list-style-type: none"> • Product geography: US Fixed Income markets • Product(s) traded: HY and IG Corporate Bonds (registered and unregistered 144A) • Trade size(s): All sizes, primarily odd lots
	Registrations and Regulatory Oversight	<ul style="list-style-type: none"> • ATS registered and entity: Yes; OpenBondX, LLC • Registered Broker Dealer and entity: Yes; OpenBondX, LLC • Regulator(s): FINRA and SEC • Other licenses: None
	Other Services	<ul style="list-style-type: none"> • Other chargeable data services/add-ons: None • Treasury spotting capabilities: Yes; via third party data feed • Treasury hedging capabilities: None

OpenBondX – Platform Characteristics

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>Platform hosts an E-RFQ trading protocol called RFFQ (Request for Firm Quote). As part of this protocol, an initiator submits a firm and executable RFFQ and responders participate in an auction-like process to anonymously fill that RFFQ within a set response time. Once time expires, the RFFQ algorithm matches the orders. Order entry period is 8:00AM-5:00PM (EST) and the order matching period is from 9:00AM-5:00PM (EST). The detailed E-RFQ protocol works as follows:</p> <ul style="list-style-type: none"> • RFFQ order process <ul style="list-style-type: none"> – Initiator creates a buy or sell RFFQ for a given CUSIP that includes a limit price or limit spread (which are only visible to the initiator), size (includes minimum fill size and optional display size [displays a portion of the order quantity – similar to an “iceberg” order type]), and RFFQ expiration time (when matching is performed, can be set in 5 minute increments during trading hours) – Any OpenBondX participant can view the RFFQ details and respond by submitting a limit price and order size – 2-sided orders cannot be submitted, however participants can near-simultaneously initiate separate RFFQs on the same issue on both sides • RFFQ matching logic <ul style="list-style-type: none"> – Matching is prioritized by (1) price or spread (at the initiator’s discretion), (2) size, and (3) response time – When limit prices (or spreads) overlap, trade is executed at the mid-point price (MP). MP is disclosed to the counterparties – Participants can respond to an RFFQ with a larger size than displayed, to receive a larger fill (if the initiator has inputted an order size that is larger than the display size, “iceberg order type”) • Near-Miss processing <ul style="list-style-type: none"> – When an RFFQ expires without an initial match, and if the RFFQ initiator’s limit price and at least one responder’s limit price are within a 1% price band from the MP (+/- 0.5% of the MP), the initiator will receive a Near-Miss offer – OpenBondX determines the MP to be the price between initiator’s limit price and most aggressive responder’s price – Responders are eligible to participate in Near-Miss processing if the offer falls within the 1% price band – The initiator is given 1 minute to opt-in and put in an order at the MP to eligible responders, who then have 1 minute to put in an order at the MP. When time expires, OpenBondX will match and execute trades based upon a size-time prioritization – Near-Miss processing works similarly for trading on spread, but instead the price band is 10 bps range
	Price Formation and Transparency	<ul style="list-style-type: none"> • Order details are anonymous to all participants from initiation through trade execution and clearing • Participants’ limit price information is not displayed, except in the Near-Miss process, where the MP price is disclosed
	Counterparty Protocol	<ul style="list-style-type: none"> • Only trade counterparties are privy to order details, while other participants can only see price information on TRACE, if the security is TRACE-eligible • Societe Generale Americas Securities, LLC (SGAS) will act as the riskless counterparty to buyers and sellers of all trades on the platform, and all trades are cleared and settled through SGAS
	Fee Structure	<ul style="list-style-type: none"> • Platform charges non-negotiable transaction fees: <ul style="list-style-type: none"> – Fees are dual-sided, with mark-up and mark-down based on fixed basis point on notional value per executed trade – All transaction fees are included in the price of the trade • Data fees/Additional service fees or Incentives/Rebates: None

OpenBondX – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities) – Access: Each participant has their own login to access the platform. Participant access controls/login procedures validate that activity comes from a known participant and source – Account and user level credit limits, including VaR limit on executed trades, VaR limit on open orders, and daily maximum notional value traded limit are set as part of onboarding consultation – For each RFFQ, participants must specify a trade size that is at or below the fat finger threshold – Duplicate order checks are performed for non-market maker participants that have more than one order open in the same security. Initiator is asked to confirm that they are aware that an existing order in the same issue (CUSIP) is currently open. If they do not confirm “yes”, then the order is rejected – Self-match prevention (“SMP”) allows entities to control trading between their own accounts types: 1) an account will not be able to trade with itself; 2) with participant guidance, all participant accounts can be configured to prohibit trading against all accounts owned/managed by the same entity Global kill switch: Yes; Platform can cancel all open orders at the platform, participant, and security level. In addition participants can cancel all of their open orders prior to execution Participant imposed limits: Yes; OBX sets the maximum limits, but participants can quest lower limits as desired
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: None Participant can initiate CSV exports of orders and/or trades Platform provides FIX drop copies that allow participants to monitor trading activity At the participant’s option, platform can automatically complete TRACE reporting
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: OpenBondX evaluates potential participants on a case-by-case basis KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes, with SGAS
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices and monitoring capabilities: Monitored; Uses external data sources for additional information as needed Off-market trade review, erroneous trade policy, trade dispute: <ul style="list-style-type: none"> – There is a written erroneous trading policy in its Subscriber Manual – In the case of a trade dispute, OpenBondX will review the dispute (e.g., market and ticket details, characteristics of the print, volatility, reasonableness of the print) and resolve disputes in-line with market dispute resolution standards
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

OpenBondX – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Web-based interface (“browser trading application”) Supports FIX 4.4 messaging
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Integrates with several OMS/EMS Provides STP to SGAS Trading and integration with Microsoft Excel Bid-list processing: Yes; Participants can either perform an upload (through CSV) or paste a list of up to 150 component orders (each order can have a discrete price/spread and quantity). Prices in the list can either be spread-based, price-based or a combination of both
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Third-party servers Secondary system: Yes Infrastructure to prevent information leakage within the firm and external: Yes; Only registered employees at OpenBondX have complete transparency to trade data as facilitators for trade support and monitoring (i.e., flexible “view only” or “trade” access available for Compliance, Risk and third party monitoring and control)
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Products and Participants: <ul style="list-style-type: none"> Migrating to a maker/taker fee structure Implementing the option to cross the underlying treasury for spread trades May roll out a central limit order book, expanding trading in US treasuries (on and off the run), non-US and/or non-USD bonds (both Corporate and Sovereign, including Emerging Debt markets) Plans to expand trade size
	Additional Notes and Comments	<ul style="list-style-type: none"> None



TMC Bonds Platform Details

TMC Bonds

Phone: 646.375.1111

Address: 850 Third Ave, 9th Floor, New York, NY 10022

Parent Firm	Platform Type	Product(s)	Category
Private – Market Participant Ownership	Varied by Protocol	Corporate Bonds and Municipal Bonds	Operational Trading Platform

Platform Overview

TMC Bonds (“TMC”) has four business segments: [1] TMC Bonds ATS Trading Platform, [2] Software (e.g., Advisor Workstation), [3] Market Data/Analytics (e.g., Idea Stream), and [4] Jointly supplied 3rd Party Services (e.g., Municipal Bonds Auto-Bidder). TMC is owned by market participants and employees but maintains independence from its owners. The platform offers two secondary market trading protocols: a (1) LOB/QS/CtT and an (2) E-RFQ. In addition, TMC has a protocol focused on primary new issuance of negotiated Municipal Bonds (out of scope for survey).

Topic		Details
Platform Summary	Corporate Structure & Additional Details	<ul style="list-style-type: none"> Parent name: TheDebtCenter, founded in 2000. The company has market participant ownership from Bank of America Merrill Lynch, Citigroup, Morgan Stanley, and Assured Guaranty Platform entity: TMC Bonds LLC, platform launched in May 2000 FTE: ~100 total, Split between ~65 in Technology, ~35 between Sales, Finance, Voice Brokerage, Marketing, and HR MPID: TMCC
	Type of Platform	<ul style="list-style-type: none"> Platform categories: Two secondary market trading protocols: (1) LOB/QS/CtT (2) E-RFQ All to All platform that is fully anonymous
	Target Participants	<ul style="list-style-type: none"> Targets Buy-Side and Dealer participants (including RIA networks) Number of participants: ~1,000 total, ~650 Retail Brokers and Dealers and ~350 Buy-Side participants User ratios: Split between 4,400 Traders (2,400 Municipal Traders and 2,000 Taxable Traders), and 150,000 Advisors Number of active participants: 80% of Traders and 29% of Financial Advisors
	Product and Market Focus	<ul style="list-style-type: none"> Product geography: US Fixed Income markets Product(s) traded: ABS, CDs, Corporate Bonds (HY and IG), MBS, Municipal Bonds, Structured Products, Treasuries, US Government Agencies Trade size(s): LOB/QS/CtT trades all sizes; E-RFQ primarily trades micro lot and odd lot
	Registrations and Regulatory Oversight	<ul style="list-style-type: none"> ATS registered and entity: Yes; TMC Bonds LLC Registered Broker Dealer and entity: Yes, TMC Bonds LLC Regulator(s): FINRA, SEC, and MSRB Other licenses: None

TMC Bonds – Platform Summary (2/2)

Topic		Details
Platform Summary	Other Services	<ul style="list-style-type: none"> • Other data services/add-ons (some of which have additional fees): <ul style="list-style-type: none"> – Trader Workstation add-ons: Trader P&L/Inventory Management System (additional fees) & various gratis services (e.g., Voice Brokerage support) and software modules (e.g., Muni Bond Insurance, New Issue Book Manager, and Compliance and Trade Surveillance Solutions) Advisor Workstation (additional fees): Wealth management functionality includes asset-gathering customer proposals, third-party data sources, pre-trade analytics, multi-asset class orders, and pre-trade and post-trade compliance – Client Investor Portal (additional fees): Retail investor websites for dealers' end customers – TMC also offers Idea Stream (real-time pre-trade decision support tool) offered either as a stand-alone web-based ASP or as an embedded "service component" within a client's host application – Municipal Auto-Bidder: Leverages a multi-factor algorithm that determines a bid price for a participant, to be applied against another participants bid wanted. It uses real-time price evaluation models, the bidder's risk constraints, and the bidder's bidding strategy (i.e. opportunistic, aggressive, conservative) • Treasury spotting capabilities: Yes, includes in-house Treasury spotting capabilities • Treasury hedging capabilities: Yes, includes in-house Treasury hedging capabilities

TMC Bonds – Platform Characteristics (1/2)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>TMC operates two secondary market All to All trading protocols:</p> <ul style="list-style-type: none"> • LOB/QS/CtT <ul style="list-style-type: none"> – The order book has different protocols based on product market (Municipals and Corporates) – Municipal market: <ul style="list-style-type: none"> ▪ Participants have full depth of market with visibility of prices, yields, spreads and sizes of all orders in the book and can click to trade ▪ Orders include: CUSIP, direction, price/yield/spread, size (option to define minimums, increments, and minimum balance remaining) ▪ All orders are live and executable – Corporate market: <ul style="list-style-type: none"> ▪ Participants have a permissioned view of the order book and can click to trade ▪ Invited Dealers (i.e., those with extensive 2-sided markets, high percentage fill rates, actionable prices, and high throughput systems), are eligible to stream two different levels of orders into the order book: Level 1 prices are only shown to specified types of counterparties (“buy and hold” dealers and buy-side customers) and Level 2 pricing is displayed to all participants (inter-Dealer) ▪ Orders include: CUSIP, direction, price/yield/spread, size (option to define minimums, increments, and minimum balance remaining) ▪ When two counterparties agree to a trade price, both counterparties have a last look (i.e., 45 seconds) prior to execution of the trade • E-RFQ <ul style="list-style-type: none"> – RFQs can be initiated by a participant for single or multiple securities and all participants can respond – The initiator can input anonymous RFQs including: CUSIP, direction, size, Bid By Time, and Firm Till time – Respondents’ quotes that are submitted during the Bid By Time will be live and executable through the Firm Till time – Platform offers the capability to see and respond to RFQs as they are submitted, or receive all the quotes at the Bid by Time – After the Firm Till time, an RFQ can be executed on a subject basis. Initiators can curtail auctions prematurely up until the auction closes; bidders can also adjust or cancel bids outright before the auction’s bid gathering period ends
	Price Formation and Transparency	<ul style="list-style-type: none"> • TMC offers real-time MSRB CUSIP level data at no charge for participants • TMC offers a live TRACE ticker feed for an additional fee (pass-through to FINRA), or participants can access a 4-hour delayed TRACE ticker at no additional cost • TMC offers platform access to traders of gratis end-of-day IDC price evaluations. TMC can permission additional subscription-based price evaluations (e.g., CEP IDC, real-time TKG, amongst others) • Price transparency differs by trading protocol: <ul style="list-style-type: none"> – LOB/QS/CtT: All orders are visible with their price, size, and size restrictions – E-RFQ: Initiator can see all quotes from all respondents (within the expiration time). Winning bidder is notified of cover bid/yield once the trade occurs. Cover bidder and others lower in rank are given basic placement information only

TMC Bonds – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Counterparty Protocol	<ul style="list-style-type: none"> TMC will generally act as a riskless counterparty to the buyers and sellers of all secondary trades on the platform All trades are cleared and settled through Pershing
	Fee Structure	<ul style="list-style-type: none"> Platform charges standardized transaction fees: <ul style="list-style-type: none"> TMC has a set fee schedule that is distributed to its participants Fees are single-sided either billed at the end of the month or with a time-of-trade spread to compensate TMC as the riskless principal. Fees are different based on product type: <ul style="list-style-type: none"> Corporate Bonds: All price-makers pay. In E-RFQ: the participants that respond to the RFQ pay; for the order book, the participants that set the price for the order will pay (participant that submits the resting order) Municipal Bonds: Sellers of the security pay Data fees/Additional service fees: Yes; for private label software services. If a participant does not subscribe to TRACE, they can subscribe to TRACE data with TMC for \$60/month per terminal pass-through for the feed Incentives/Rebates: Negotiable based upon significant volumes

TMC Bonds – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> • Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities), desk level, and individual trader level – TMC has a real-time credit risk management system with an ongoing proprietary risk model that takes a participant's accumulated buys and sells, market movements, and financials into account when setting limits – TMC offers a full suite of compliance services on a pre-trade, at-time-of-trade, and post-trade basis – Limits can be set at the order level – Soft and hard limits can be set at the order level, trader level, and firm level for each participant – Max trade size is \$50mm and there is a soft limit for any trades over \$20mm • Global kill switch: Yes, Platform can cancel all open orders on the platform. In addition, participants can cancel all of their open orders prior to execution • Participant imposed limits: Yes, for SEA 15c-3-5 or for participants that connect through the Advisor Workstation
	Client Reporting Capabilities	<ul style="list-style-type: none"> • Best execution analysis/TCA: A Compliance Reporting Suite (including Best Execution tools) is incorporated within the platform • Trade/Proposal Reports: TMC provides a selection of Quick Reports (Offerings Reports, Bond Review Reports, Bond Comparison Reports) as well as Client Proposal Reports (Bond Insurance Reports, Ladder Reports, Offering List Reports, Horizon and Sensitivity Analyses) that can be obtained for an additional fee
	Subscriber Eligibility	<ul style="list-style-type: none"> • Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Participants are either eligible as a Broker Dealer or under basic “Customer” categories (Banks & Credit Unions, PE/Hedge Funds, Insurance Companies, RIAs, RICs/Trusts) – Each category has its own set of documents/requirements for the onboarding process, such as: <ul style="list-style-type: none"> ▪ RIAs must have \$250mm minimum in assets and \$100mm in AUM (for Municipals) ▪ Offshore Hedge Funds must have \$1+bn in minimum firm-wide assets – Entities cannot participate if they do not adhere to FINRA 2111 (Corporates/Municipals). Further attestations apply for Municipal trading access whereby one needs to be an “SMMP” (under MSRB Rules G-15 and G-48). • KYC/AML procedures: Yes, in addition to OFAC (unless the participant is a self-service participant and is using TMC Bonds as software service provider only) <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes, with Pershing
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> • Abusive trading practices and monitoring capabilities: Monitored extensively given central counterparty status • Off-market trade review, erroneous trade policy, trade dispute: Yes; Platform has a firm written policy for erroneous trades and trade dispute in place. Platform is continuously monitored for off-market trades
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> • Participants can use 3rd party IMS tools (e.g., Bloomberg TOMS) or access a TMC proprietary version. With this, users have access to a Position Blotter which tracks the participant's owned securities by automatically updating positions bought, sold or ticketed on the TMC Inventory Management System. The system generates mark-to market P&L and unrealized P&L on a daily basis

TMC Bonds – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Semi-customizable web-based interface supported by Java, JavaScript, Jboss Supports FIX 4.4 messaging
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Provides STP connectivity to Pershing and other main fully disclosed clearing firms For enterprise clients, TMC integrates with back office systems (BETA, Broadridge, etc.), pre-trade "Rules Engines", client holdings, and the latest in single sign-on logons—including adherence to authentication/encryption protocols such as SAML 2.0 Integrates to several OMS/EMS Order book is integrated with the NYSE Bonds order book Provides white label services to RIA and Advisor client networks Bid-list processing: Yes
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Owned hardware Secondary system: Yes; located in Secaucus, NJ and Chicago, IL Infrastructure to prevent information leakage: <ul style="list-style-type: none"> Production/Backup processing centers have a strict security environment that can only be accessed by authorized TMC Bonds personnel Any proprietary or highly confidential information (i.e. credit information) has limited access to specialized TMC Bonds personnel on a need-to-know basis only
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Technology and Integration: <ul style="list-style-type: none"> Expansion of Idea Stream (push-based solution) Continuous enhancement of the Advisor Workstation suite Products and Participants: <ul style="list-style-type: none"> Upgrades for newly enacted best execution mandates (both FINRA 5310 and MSRB G-18) Plans to enhance the market data analytics business
	Additional Notes and Comments	<ul style="list-style-type: none"> None



Tradeweb Platform Details

Tradeweb

Phone: 646.430.6000

Address: 1177 Avenue of the Americas, New York, NY 10036

Parent Firm	Platform Type	Product(s)	Category
Private – Market Participation	Varied by protocol	Corporate (HY and IG) and Municipal Bonds	Operational Trading Platform and Technology Provider

Platform Overview

Tradeweb is an international financial services company that builds and operates electronic marketplaces for participants that trade fixed income and derivatives globally. Tradeweb has two platforms that facilitate electronic trading of US Corporates and Municipal securities: (1) Tradeweb (Institutional) and (2) Tradeweb Direct (focused on retail size order flow). The firm also offers an inter-dealer platform, Dealerweb, that is not in the purview of this survey because it does not provide a fully electronic platform for US Corporate securities.

Topic		Details
Platform Summary	Corporate Structure & Additional Details	<ul style="list-style-type: none"> Parent name: Tradeweb Markets LLC, founded in 1998. The firm is majority owned by Thomson Reuters, with 11 other Dealer owners (Dealers' total ownership less than 50%) <p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> Platform entity: Tradeweb LLC, which launched its U.S. institutional credit market in October 2014 FTE: ~50 total; Platform leverages parent company's infrastructure for support MPID: N/A <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> Platform entity: Tradeweb Direct LLC, launched in 2006 FTE: +120 total; Platform leverages parent company's infrastructure for support MPID: BDTT
	Type of Platform	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> Platform category: Two protocols: (1) two E-RFQs types: (a) Blast RFQ and (b) Focused RFQ; and (2) REALstreams (Click to Trade) Trades are Dealer to Buy-Side on a fully disclosed basis <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> Platform category: Two protocols: (1) E-RFQ (both single and multiple securities) and (2) Inventory-Based Click to Trade Trades are Dealer to Dealer on a pre-trade anonymous basis or Dealer to Buy-Side (Middle Market Institutional Clients) on a fully anonymous basis
	Target Participants	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> Targets Dealer and Buy-Side participants Number of participants: ~340 total; Split between ~300 Buy-Side participants and ~40 Dealers (11 Dealers stream quotes) Number of active participants: More than 100 participants <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> Targets Dealer and Buy-Side participants (RIAs and Asset Managers with retail order-flow) Number of participants: 615 total; Split between ~415 Buy-Side participants and ~200 Dealers Number of active participants: 65%, ~406

Tradeweb – Platform Overview (2/2)

Topic		Details
Platform Summary	Product and Market Focus	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Product geography: US and other Developed and Emerging Fixed Income markets • Product(s) traded: Trades HY and IG Corporate Bonds (registered and unregistered 144a) • Trade Size: Odd lot and round lot; E-RFQ typically also has block size trades; No trade minimum size <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Product geography: US Fixed Income markets • Product(s) traded: ABS, CDs, CMO, HY and IG US Corporate Bonds (only registered securities), US Government Agencies, MBS, Municipal Bonds, Preferred Stock, US Treasuries • Trade size(s): Odd and Micro lot
	Registrations and Regulatory Oversight	<p>Tradeweb (Institutional): Platform is a technology provider</p> <ul style="list-style-type: none"> • ATS registered and entity: No • Registered Broker Dealer and entity: Yes; Tradeweb LLC • Regulator(s): FINRA and SEC • Other licenses: None <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • ATS registered and entity: Yes; Tradeweb Markets LLC • Registered Broker Dealer and entity: Yes; Tradeweb Markets LLC • Regulator(s): FINRA, SEC, and MSRB • Other licenses: None
	Other Services	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Other chargeable data services/add-ons: <ul style="list-style-type: none"> – Live TRACE data is available for an additional charge – Tradeweb provides a Market Transparency (Best Execution) report • Treasury spotting capabilities: Yes, Leverages Tradeweb’s Treasury trading platform • Treasury hedging capabilities: Yes, Leverages Tradeweb’s Treasury trading platform <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Other chargeable data services/add-ons: <ul style="list-style-type: none"> – Live TRACE data is available for an additional charge – Provides white labeled platform technology and support for Advisor, Trader, and Investor workstations – Provides customized tools that help manage portfolio and evaluate risk that are fully integrated to workstations • Treasury spotting capabilities: None • Treasury hedging capabilities: None

Tradeweb – Platform Characteristics (1/3)

Topic	Details
Platform Characteristics Trading Procedures and Protocol	<p>Tradeweb (Institutional) has two protocol types (1) E-RFQ and (2) Click to Trade for Buy-Side and Dealer participants. All interactions are between counterparties with existing relationships because counterparties face each other directly for trades. Trading hours are between 7:30AM-5:00PM EST</p> <ul style="list-style-type: none"> • E-RFQs <ul style="list-style-type: none"> – Blast-RFQ <ul style="list-style-type: none"> ▪ Protocol is Dealer to Buy-Side focused that allows for participants to send RFQs to Dealers with which the participant is permitted ▪ Participants initiate RFQs for a single security or lists of securities and can include: CUSIPs, direction, size (indicating all-or-none or partial), spot/cross, and Due-In and Good For time ▪ Dealers can respond with quotes on all securities, a select group of securities, or an individual security within the expiration time ▪ Platform displays all responses from Dealers ranked by price to the initiator at the expiration time ▪ The initiator can accept or counter Dealer quotes – Focus-RFQ <ul style="list-style-type: none"> ▪ Protocol is Dealer to Buy-Side focused that allows for participants to send RFQs to Dealers with which the participant is permitted ▪ The initiator can send a single security RFQs to a maximum of 5 Dealers including: CUSIP, direction, size (indicating all-or-none or partial), spot/cross ▪ Dealers can respond with a quote within a fixed expiration time ▪ Platform displays a ranking of the 5 Dealer quotes to the initiator at the expiration time which the initiator can only accept or reject • REALstreams (Click to Trade) <ul style="list-style-type: none"> – Streams are Dealer to Buy-Side, where Dealers stream quotes to all permitted Buy-Side participants – Buy-Side participants have the ability to hit or lift liquidity from the streams – Platform displays a ranking by price of Dealer quotes – Once a Buy-Side hits or lifts a price, the Dealer has a last look prior to execution

Tradeweb – Platform Characteristics (2/3)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol (cont'd)	<p>Tradeweb Direct has two protocol types (1) E-RFQ and a (2) Inventory-based Click to Trade. Trading hours are between 8:00AM-5:00PM EST</p> <ul style="list-style-type: none"> • E-RFQ <ul style="list-style-type: none"> – RFQ protocol that is both Dealer to Dealer and Dealer to Buy-Side (Middle Market Institutional Clients) – Participants can send a RFQs to all platform participants simultaneously for a single security or a list of securities including: CUSIP, size, and direction, and expiration time – Dealers can respond with quotes on all securities, a select group of securities, or an individual security within the expiration time, and can set an expiration time on their firm quotes to the initiator – Platform displays responses to the initiator as they are submitted, but the initiator can only trade after the collection period ends. The quotes are only live and are executable during the Good For Time • Inventory-based Click to Trade <ul style="list-style-type: none"> – Participants have full depth of market for Dealer-streamed quotes with visibility of CUSIP, price (updated throughout the day), direction, and size – Participants have the option to filter out participants they do not wish to trade with; however, participant identity is not disclosed until the point of execution – Quotes are live and executable and participants can click to trade – Participants have the capability to negotiate prices for Municipal securities only
	Price Formation and Transparency	<p>Tradeweb (Institutional): Provides participants pre-trade access to trade grids and filters, composite pricing, bond pricing screens, trade history reports, and market data</p> <ul style="list-style-type: none"> • E-RFQ: Initiator views a ranked list of Dealers' quotes that are submitted prior to expiration time. The winning Dealer is notified of the cover level and the cover Dealer is only notified of their status but no price information. The remaining respondents are notified that another bidder has executed the trade • REALstreams (Click to Trade): Filtering capabilities allow participants to view a live feed of the following: number of participants that are streaming, composite pricing and runs, the average stream, Dealers contributing inventory <p>Tradeweb Direct: Provides trading history from TRACE and EMMA (MSRB price tool) in addition to a like-security algorithms where the software provides pricing for 10 other securities that are similar to the security a participant is trying to price</p> <ul style="list-style-type: none"> • E-RFQ: Initiator will view a ranked list of Dealers' quotes that are submitted prior to collection period. If a RFQ becomes an executed transaction, all Dealers who participated in the RFQ process will see their own bid, the winning bid, and their rank in the auction. The winner will also see the cover price. The cover is notified that they are the cover. If the RFQ does not execute the bidders will only know how they were ranked compared to other responses, but the best bid is not be disclosed • Inventory-based Click to Trade: Filtering capabilities allow participants to view streams from permissioned Dealer

Tradeweb – Platform Characteristics (3/3)

Topic		Details
Platform Characteristics	Counterparty Protocol	<p>Post-trade, only trade counterparties are privy to trade details, while other participants can only view information of trades completed via TRACE and EMMA feeds, provided they are TRACE/EMMA-eligible</p> <p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • For all trades, counterparties have existing relationships and trades are executed between the two parties directly. • Counterparties are fully disclosed on the platform • Buy Side participants can also participate in Tradeweb Direct liquidity pool via intermediation with Tradeweb Direct LLC <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • For Dealer to Dealer trades: Tradeweb Direct does not intermediate. Counterparties have existing relationships and trades are executed between the two parties. Counterparties are anonymous pre-execution but disclosed post-trade in order to facilitate trade execution • For Dealer to Buy-Side trades: Tradeweb Direct intermediates the trade as the riskless principal. Clearing and settlement is completed by National Financial Services LLC (“NFS”). Counterparties remain anonymous through settlement
	Fee Structure	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Platform charges subscription fees and single-sided transaction fees (no additional details disclosed) • Data fees/Additional service fees: None • Incentives/Rebates: None <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Platform charges single-sided transaction fees and other transaction fees (no additional details disclosed) • Data fees/Additional services fees: Enterprise licensing fee for white-labeling of platform and technology services • Incentives/Rebates: None

Tradeweb – Platform Risk, Reporting, and Compliance (1/2)

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (on boarded entities), desk level, trader level, and product level – Access: Participants have access to the platform at the user level – All execution buttons are setup with dual-clicks to avoid fat finger errors • Global kill switch: Dealer participants can cancel all of their open orders prior to execution • Participant imposed limits: Yes, size limits are controlled by the participant's authorized admin <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (on boarded entities), desk level, trader level, and product level – Tradeweb imposes limits on size of trade and overall daily transactions for Buy-Side participants on a case-by-case basis • Global kill switch: Yes; Platform can cancel all open orders at the platform, participant, and security level • Participant imposed limits: Yes, Each participant can limit the notional amount of bonds that they would trade in, both in an individual transaction as well as a total notional amount they would trade across the platform on a given trading day
	Client Reporting Capabilities	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Best execution analysis/TCA: Yes <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Best execution analysis/TCA: Yes

Tradeweb – Platform Risk, Reporting, and Compliance (2/2)

Topic		Details
Platform Risk, Reporting, and Compliance	Subscriber Eligibility	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Participants/Subscribers must meet the platform’s participation criteria (details not disclosed) – Buy-Side participants must be onboarded by a Dealer participant • KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: N/A; Transactions are executed directly between counterparties • Notifications for new participants: Yes; Buy-Side participants are notified of new Dealers, and Dealers are notified if a new Buy-Side participant has requested a trading relationship with them on the platform <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Participants/Subscribers must meet the platform’s participation criteria (details not disclosed) • KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes, with National Financial Services (only for participants where Tradeweb acts as the intermediary) • Notifications for new participants: Yes, All participants are informed. Existing participants can automatically include a new participant in their liquidity pool or require a positive affirmation of that new participant as an eligible trading counterparty
	Trade Dispute and Erroneous Trade Policies	<p>Both Platforms:</p> <ul style="list-style-type: none"> • Abusive trading practices and monitoring capabilities: Monitored • Off-market trade review, erroneous trade policy, trade dispute: Yes, Tradeweb has firm policies in place
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> • The Tradeweb Institutional and Tradeweb Direct platforms support a wide range of risk, reporting and compliance solutions, but did not disclose additional detail here.

Tradeweb – Platform Technology and Additional Information (1/2)

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Platform UI and protocols supported: <ul style="list-style-type: none"> – Client installed software – Supports FIX 4.4 messaging and provides API <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Platform UI and protocols supported: <ul style="list-style-type: none"> – Web-based platform – Supports FIX 4.4 messaging and provides API
	Integration Capabilities	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • OMS and other system integrations: <ul style="list-style-type: none"> – Provides STP to the clearing houses – Integrates with several OMS/EMS <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • OMS and other system integrations: <ul style="list-style-type: none"> – Provides STP to clearing houses – Integrates with several OMS/EMS – Majority of the participants are fully integrated to the platform, mainly for all pre-trade procedures for retail institutions • Provides white label services for advisors through an Enterprise license • Bid-list processing: Yes
	Data Security and Platform Reliability	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Disaster recovery plans and systems: <ul style="list-style-type: none"> – Primary system: Owned hardware; multiple locations – Secondary system: Yes <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Disaster recovery plans and systems: <ul style="list-style-type: none"> – Primary system: Owned hardware – Secondary system: Yes • Architecture leverages clustered databases, message persistence, and redundant servers. Tradeweb’s website uses 128-bit SSL encryption, and clients using the front-end can access the site using industry-standard SAML authentication

Tradeweb – Platform Technology and Additional Information (2/2)

Topic		Details
Additional Platform Information	Short to Medium Outlook	<p>Tradeweb (Institutional):</p> <ul style="list-style-type: none"> • Technology and Integration: <ul style="list-style-type: none"> – Plans to further build out TCA functionality • Products and Participants: <ul style="list-style-type: none"> – Actively on-boarding new clients and liquidity providers <p>Tradeweb Direct:</p> <ul style="list-style-type: none"> • Technology and Integration: <ul style="list-style-type: none"> – Migrating to a single portfolio analytics package (as part of an enterprise license) that can do full portfolio analysis and shock analysis on client holdings
	Additional Notes and Comments	<ul style="list-style-type: none"> • Tradeweb publishes a monthly Market Transparency Report. The data provided details transparency in fixed income markets for retail investors. i.e. trends, trade volumes, and active issuers



TradingScreen Platform Details

TradingScreen

Phone: 212.359.4100

Address: 215 Park Avenue S., #1300, New York, NY 10003

Parent Firm	Platform Type	Product(s)	Category
Private	Varied by protocol	Corporate Bonds (HY and IG)	Operational Technology Provider

Platform Overview

TradingScreen, an independent provider of electronic trading solutions, has launched two protocols in the US: 1) TradeCross, a crossing system for block trades in Fixed Income Corporate Bonds powered by its exchange technology in SaaS, and 2) an E-RFQ trading protocol that supports a Dealer to Buy-Side RFQ protocol and collect and distributes Axes to the market participants. In Europe, TradingScreen offers these same protocols as well as Galaxy MTF, which is an All to All Lit Order Book for odd lot size trades.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> Parent name: TradingScreen Inc. founded in 1999 (98% owned by employees) Platform entity: TradingScreen Inc., Galaxy launched in 2012, TradeCross launched in September 2015 FTE: ~175 total, and split between ~30% Finance, 55% Technology, and 15% Operations MPID N/A
	Type of Platform <ul style="list-style-type: none"> Platform category: Two trading protocols: <ul style="list-style-type: none"> TradeCross (Hidden Order Book): All to All E-RFQ: Dealer to Buy-Side
	Target Participants <ul style="list-style-type: none"> Targets all Buy-Side and Dealer participants Number of participants: ~ Launch ramp up in progress Number of active participants: Launch ramp up in progress
	Product and Market Focus <ul style="list-style-type: none"> Product geography: US and other Developed and Emerging Fixed Income markets Product(s) traded: Trades HY and IG Corporate Bonds (only registered) in the US and other securities globally, Trade size(s): Odd lot and block trades
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> ATS registered and entity: None Registered Broker Dealer and entity: Yes; TradingScreen Brokerage Services LLC Regulator(s): FINRA, SEC, (NSA, and AMF Switzerland outside US) Other licenses: None
	Other Services <ul style="list-style-type: none"> Other chargeable data services/add-ons: TradingScreen offers several white-labeled workstation options to manage Fixed Income securities processing at an additional charge Treasury spotting capabilities: Yes; Through a third-party venue Treasury hedging capabilities: Yes; Through a third-party venue

TradingScreen – Platform Characteristics

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>TradingScreen offers two trading protocols in the US:</p> <p>TradeCross (Hidden Order Book)</p> <ul style="list-style-type: none"> – All to All protocol that focuses primarily on block trades – Participants enter indications of interest including: Identifier, price range, size, and direction (size parameters i.e., minimum, minimum increments, and minimum residual size) – TradeCross displays list of security that have interest (without direction or any price information) for eligible counterparties as previously permitted by the initiator – Opposing indications of interest interests are matched and notified only if each participant is within the price parameters. Participants are then permitted to negotiate a trade <p>• E-RFQ</p> <ul style="list-style-type: none"> – Protocols facilitates Dealer to Buy-Side trades that focuses primarily on capital intermediation – Initiators can select a single Dealer or a group of Dealers to send an RFQ – The RFQ includes: size, direction, CUSIP, and expiration time; RFQs can be for single or multiple securities – Respondents can only respond to the RFQ within the expiration time, where their responses are firm and executable – Initiators can view and accept quotes as they are received within the expiration time
	Price Formation and Transparency	<ul style="list-style-type: none"> • Price transparency varies per trading protocol: <ul style="list-style-type: none"> – TradeCross: Orders details are not disclosed – E-RFQ: Participants can only see bids/quotes sent to them (responders are not provided with details except that price is accepted or rejected unless initiator had selected to share details when setting up the RFQ)
	Counterparty Protocol	<ul style="list-style-type: none"> • Participants can limit eligible counterparties within both protocols. TradeCross does not intermediate any trades, all trades are executed and cleared off the platform, and the counterparty protocol varies based on the interaction: <ul style="list-style-type: none"> – Dealer to Dealer trades: Dealers face each other for all transactions and identities are disclosed upon trade execution – Dealer to Buy-Side and Buy-Side to Buy-Side trades: Buy-Side participants must select an intermediating Dealer, who will facilitate the trade on their behalf. Buy-Side participants must establish those Dealer relationships independently of TradingScreen – Buy-Side participants remain anonymous due to intermediating Dealer
	Fee Structure	<ul style="list-style-type: none"> • Platform charges negotiable subscription and transaction fees: <ul style="list-style-type: none"> – Subscription fees: Fees are contingent upon how the participant accesses the platform – Transaction fees: <ul style="list-style-type: none"> ▪ Fees are dual-sided with a mark-up and mark-down that is based on bond maturity and bond type ▪ Transaction fees are included in the trade price • Data fees/Additional service fees: Yes; Has pass-through fees for TRACE data feeds • Incentives/Rebates: None

TradingScreen – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (on boarded entities), desk level, and trader level – Fat finger checks based on deviation from reference prices. Programmable limit and restricted trading lists are available within a suite of risk controls Global kill switch: Yes, TradingScreen can cancel all open orders at the platform, user, product, and segment level. Participants have the ability to cancel-all open orders Participant imposed limits: Yes, Dealers can place limits on other Dealers on the platform
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: Yes and provides TCA consulting services
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: Platform evaluates potential participants on a case-by-case basis KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house for Dealers; however Dealers handle on-boarding of Buy-Side participants – Clearing firm onboarding and procedures: N/A
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices and monitoring capabilities: Monitored Off-market trade review, erroneous trade policy, trade dispute: Platform has a firm written policy in place
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

TradingScreen – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> TradeNext HTML 5 and TradeSmart professional java GUIs covering needs of all participants TradeFast FIX based API and COM API
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Provides STP to clearing partners Currently connects to a significant number of EMS/OMS/PMS (including other asset classes). Has the ability to connect to other trading platforms Provides private label services Bid-list processing: Yes
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Owned Hardware; Has multiple datacenters located globally Secondary system: Yes
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Technology and Integration: <ul style="list-style-type: none"> Plans to have additional enhancements to the platform in areas of Compliance and Risk Products and Participants: <ul style="list-style-type: none"> Plans to increase the number of participants and trading volume (Platform is in its early stages)
	Additional Notes and Comments	<ul style="list-style-type: none"> None



TruMid Platform Details

TruMid

Phone: 212.618.0950

Address: 120 Broadway, 9th Floor, New York, NY 10271

Parent Firm	Platform Type	Product(s)	Category
Private – Independent	All to All	Corporate Bonds (HY and IG)	Operational Trading Platform

Platform Overview

TruMid is an electronic trading platform for Corporate Bonds. TruMid hosts matching sessions called “swarms”, each swarm can be based on industry sector, news or corporate events, or participant requests. Swarms have up to three phases, where the first two phases allow participants to trade within price ranges set by TruMid, while TruMid gathers information to algorithmically determine the midpoint price (MP) for each security. The third phase will allow participants to trade at the MP for the remaining volume of securities that did not execute in the first two phases of the session. Toward the end of Q1 2016, TruMid will introduce a new release, which includes additional “swarm on demand” functionality and a new user interface.

Topic		Details
Platform Summary	Corporate Structure & Additional Details	<ul style="list-style-type: none"> Parent name: TruMid Holdings LLC (employee and investor owned); founded in June 2014 Platform entity: TruMid Financial LLC, platform launched in April 2015 FTE: Not disclosed MPID: TMID
	Type of Platform	<ul style="list-style-type: none"> Platform category: Matching Sessions (partially Real-Time Matching and partially End of Session Matching depending on phase) All to All platform that is fully anonymous
	Target Participants	<ul style="list-style-type: none"> Targets: Buy-Side and Dealer participants Number of participants: 214 total; Split between 131 Hedge Funds, 52 Asset Managers, 31 Broker Dealers (5 are Bulge Bracket) Number of active participants: Not Disclosed
	Product and Market Focus	<ul style="list-style-type: none"> Product geography: US Fixed Income markets Product(s) traded: HY and IG Corporate Bonds (registered and unregistered 144A) Trade size(s): Round lot and block trades
	Registrations and Regulatory Oversight	<ul style="list-style-type: none"> ATS registered and entity: Yes; TruMid Financial LLC Registered Broker Dealer and entity: Yes; TruMid Financial LLC Regulator(s): FINRA and SEC Other licenses: None
	Other Services	<ul style="list-style-type: none"> Other chargeable data services/add-ons: None Treasury spotting capabilities: Yes; via third-party data feed Treasury hedging capabilities: Yes; via third-party platform

TruMid – Platform Characteristics (1/2)

Topic	Details
Platform Characteristics Trading Procedures and Protocol:	<p>Platform hosts matching sessions called “swarms”, each swarm can be based on industry sector, market news or corporate events, or participant requests</p> <ul style="list-style-type: none"> • TruMid determines an initial midpoint price (MP) for each security included in the swarm, as well as determines a bid/offer range from the MP that participants can trade in • Each swarm has up to three timed phases. The first two phases are designed to help determine a new midpoint price, referred to as the TruMid, based on participants’ orders and trading activity. The third phase will facilitate trading at the TruMid for listed securities • First Order Phase (End of Session Matching) <ul style="list-style-type: none"> – All swarm securities are displayed to all participants and trades are executed at the end of the phase – Participants can enter firm bids, offers, or 2-way orders for swarm securities at price increments within each bond’s pre-defined bid/offer range around the initial midpoint – Orders are matched and executed at the end of the phase – Counterparties of a trade will see price and size details, other swarm participants only see that a security has traded • Active Phase (Real-Time Matching) <ul style="list-style-type: none"> – Un-matched First Order Phase orders are brought over and listed in Active phase – Participants can enter new orders or update orders that were not matched in the first order phase – Orders are firm and executable and are continuously matched throughout Active phase, which is similar to click-to-trade • TruMid Phase (End of Session Matching) <ul style="list-style-type: none"> – All participants have access to trade at the TruMid price, the midpoint determined by activity from the prior two phases – Participants enter firm orders (Order types: Outright, OCO (One Cancels the Other) and Swap) and TruMid uses a volume optimizing algorithm to match the highest volume of orders at the end of the TruMid phase <p><u>Additional Feature in New Release:</u></p> <p>Toward the end of Q1 2016, TruMid will introduce additional functionality that allows users to access liquidity within the TruMid network at any point during trading hours</p> <ul style="list-style-type: none"> • “Swarms-on-demand” allow each user to initiate swarms and control security selection and timing • Historical activity and sector/credit preferences set by each participant are utilized to notify them of swarms with securities relevant to them • “Swarm-on-demand” (user-initiated swarms) will largely follow the same trading protocols as the current TruMid-initiated swarms

TruMid – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Price Formation and Transparency	<ul style="list-style-type: none"> Level of price transparency differs by phase: <ul style="list-style-type: none"> First Order Phase: All participants see price range and initial MP Active Phase: All participants see the best bid and best offer and when a trade is completed TruMid Phase: All participants see the new MP
	Counterparty Protocol	<ul style="list-style-type: none"> Only trade counterparties have access to order details, while other participants can only see price information on TRACE, if the security is TRACE-eligible State Street Global Markets (SSGM) acts as the riskless counterparty to buyers and sellers of all trades on the platform, and all trades are cleared and settled through SSGM
	Fee Structure	<ul style="list-style-type: none"> Platform charges non-negotiable transaction fees: <ul style="list-style-type: none"> Fees are dual-sided, with a bilateral mark-up and mark-down: <ul style="list-style-type: none"> For Distressed/HY, the fee is 1/16 bps For IG, the fee ranges from 0.3-0.5 bps, depending on maturity Trades are reported net of mark-ups and mark-downs SSGM receives a share of the above transaction fee for execution services Data fees/Additional service fees: None Incentives/Rebates: None

TruMid – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> • Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (participants represent entities on the TruMid platform) and at the individual user level (e.g., Trader at Dealer or Buy-Side institution) – Price ranges are algorithmically pre-set by TruMid so participants cannot enter trades that are off-market – Price increments are pre-set by TruMid so participants cannot enter into trades that are off-market – Price increments are standard for each product (1/2 for spread-based, 1/8 for price based) – For trades above \$25mm in Distressed/HY and above \$35mm in IG, participants are asked to double-confirm the trade to prevent fat finger mistakes • Global kill switch: Yes; Platform has ability to terminate a swarm in event of technological errors • Participant imposed limits: Participants have ability to cancel all their orders throughout course of swarm
	Client Reporting Capabilities	<ul style="list-style-type: none"> • Best execution analysis/TCA: Offers post-swarm audit trail (TRU Report) for participants who have completed a trade • Upon completion of a swarm, participants gain access to a trade blotter that provides details on their executed trades
	Subscriber Eligibility	<ul style="list-style-type: none"> • Specific criteria for subscriber eligibility: TruMid evaluates potential participants on a case-by-case basis • KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes, with SSGM – Participant list is kept confidential
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> • Abusive trading practices and monitoring capabilities: Monitored, TruMid maintains detailed audit trails for each swarm • Off-market trade review, erroneous trade policy, trade dispute: <ul style="list-style-type: none"> – Has an erroneous trading policy, as well as a trade dispute policy – Orders when submitted are firm and executable
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> • The SEC-registered Rulebook is the governing set of standards for platform

TruMid – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: <ul style="list-style-type: none"> Web-based interface and hosted via dual Amazon Web Services (“AWS”) cloud infrastructure Post trade processing is available via FIX 4.4 and 5.0 protocol
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: Provides STP to clearing house, SSGM Bid-list processing: N/A
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Third-party servers provided by AWS Secondary system: Yes
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Features of New Release (toward end of 1Q16) <ul style="list-style-type: none"> New user interface: efficient and interactive toolbar is users’ access point to TruMid network “Swarm on Demand”: Users may access liquidity within the network at any point during the day Targeted communications fit within users’ workflows Maintain and update watch lists and enter indications of interest OMS and other system integration: Support FIX 4.4 and 5.0SP2 protocol Chromium environment supported by OpenFin Participants: <ul style="list-style-type: none"> Expects to onboard approximately 200 more clients in 2016
	Additional Notes and Comments	<ul style="list-style-type: none"> None

PLATFORM IS NOT YET LAUNCHED: Therefore all content described is suppositional



Clarity BidRate Platform Details

Clarity BidRate

Phone: 212.867.9819

Address: 405 Lexington Ave. Floor 53, New York, NY 10174

Parent Firm	Platform Type	Product(s)	Category
Private – Independent	Varied by Protocol	Resetting Municipal Bonds	Non-Operational Trading Platform

Platform Overview

The Clarity BidRate Alternative Trading System (Clarity) is a web-based platform that facilitates interest rate resets and secondary trading of four types of proprietary resetting Municipal Bonds. For traditional resetting Municipal bonds, a Remarketing Agent sets the new interest rate at each reset; however, Clarity has designed biddable variations of these securities, where the interest rate resets are determined through Dutch auctions on the platform. In between the periodic rate resets, Clarity will host secondary trading of these securities within a Click to Trade Book.

Topic	Details
Platform Summary	<p>Corporate Structure & Additional Details</p> <ul style="list-style-type: none"> • Parent name: Arbor Research and Trading LLC (Arbor), founded in 1988 • Platform entity: Clarity BidRate Alternative Trading System LLC, approved to operate in the US in November 2013 • FTE: 5 total; platform leverages parent infrastructure for support (~60 employees) • MPID: CLRT
	<p>Type of Platform</p> <ul style="list-style-type: none"> • Platform categories: Two protocols: <ul style="list-style-type: none"> – Competitive Bid Process (Dutch Auction): Resets of the 4 proprietary Clarity security types through Dutch auction. Protocol is Bond issuer-to-All and fully anonymous – Secondary Offering Screens (Click to Trade Book): All-to-All and anonymous for trading between security resets
	<p>Target Participants</p> <ul style="list-style-type: none"> • Targets Municipal Bond issuers as well as Buy-Side and Dealer participants • Number of participants: 15 investors have signed up and 2 issuers are committed • Number of active participants: N/A – platform has not formally launched
	<p>Product and Market Focus</p> <ul style="list-style-type: none"> • Product geography: US Fixed Income markets • Product(s) traded: Clarity hosts a Competitive Bid Process (Dutch Auction) for four proprietary securities, which are biddable variations of Municipal resettable bonds. The issuer must market one of the new proprietary securities for it to trade on the platform. The four securities are: <ul style="list-style-type: none"> – Biddable-Variable Rate Demand Obligations (B-VRDO): <ul style="list-style-type: none"> ▪ The bond's coupon is based on a Competitive Bid Process (Dutch Auction) but bids may be entered based on a nominal basis or as a spread to a pre-determined benchmark ▪ The spread resets through auctions on the Clarity platform at pre-defined intervals (typically weekly) ▪ The issuer engages a Liquidity Bank in each bond issuance, the Liquidity Bank is contractually obligated to submit a bid for the full size at each reset ▪ These securities are eligible for Money Market Fund investments (2a-7 eligible) – Biddable-Tender Option Bonds (B-TOB): <ul style="list-style-type: none"> ▪ The bond's coupon resets through a Competitive Bid Process (Dutch Auction) on the Clarity platform and the bond's reset characteristics are determined between the issuer and liquidity bank ▪ A Liquidity Bank is contractually obligated to submit a bid for the full size at each reset ▪ These securities are eligible for Money Market Fund investments (2a-7 eligible)

Clarity BidRate – Platform Summary (2/2)

Topic		Details
Platform Summary	Product and Market Focus (cont'd)	<ul style="list-style-type: none"> – Biddable-Floating Rate Notes (B-FRN) (Pending SEC approval): <ul style="list-style-type: none"> ▪ The bond's coupon is based on a spread to a pre-determined benchmark ▪ The spread is reset through a Competitive Bid Process (Dutch Auction) on the Clarity platform at pre-defined intervals (typically quarterly). Typically the mandatory tender is a rolling 2-3 years. For example, at each successful reset, the mandatory tender date on a quarterly reset will extend for an additional 90 days. If there is an unsuccessful reset, the mandatory tender locks in and each successive unsuccessful reset clicks down to the mandatory tender date. If there is a successful reset at any time before the mandatory tender date, the rolling mandatory tender resumes ▪ Securities can be eligible for Money Market Fund investments depending on reset characteristics – Biddable-Market Liquidity Variable Rate Securities (B-MLVRS) (Pending SEC approval): <ul style="list-style-type: none"> ▪ The interest rate of this security is a nominal coupon that may be based on the spread to a pre-defined benchmark ▪ The bond's coupon is reset based on a Competitive Bid Process (Dutch Auction) ▪ Pre-determined Mandatory Tender triggered by a given number of continuous unsuccessful resets ▪ The security has a long-term final maturity with frequent resets on the platform, typically every 7, 28, 35, or 90 days ▪ Money Market Fund eligible <ul style="list-style-type: none"> • Trade type(s): Round lot and block • Minimum denomination is \$100k and trades in increments of \$100k (at minimum)
	Registrations and Regulatory Oversight	<ul style="list-style-type: none"> • ATS registered and entity: Yes; Clarity BidRate Alternative Trading System LLC • Registered Broker Dealer and entity: Yes; Arbor Research and Trading LLC • Regulators: FINRA and SEC • Other licenses: None
	Other Services	<ul style="list-style-type: none"> • Other chargeable data services/add-ons: None • Treasury spotting capabilities: None • Treasury hedging capabilities: None

Clarity BidRate – Platform Characteristics

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>The Clarity platform facilitates the resetting of the aforementioned four securities exclusively on the platform. Buy-Side and Dealer participants can participate in a Dutch Auction and Click to Trade Book</p> <ul style="list-style-type: none"> • Issuance <ul style="list-style-type: none"> – The issuer and underwriting Dealer execute the primary issuance of a bond outside of the Clarity platform. Once the security has been issued, the underwriting Dealer on-boards the security to the Clarity platform for the subsequent resets: • Competitive Bid Processing – Dutch Auction <ul style="list-style-type: none"> – As a rate reset approaches for a security, all participants on the Clarity platform are notified of the upcoming auction – Participants can see recent rate history of the security, the deal size, and the issuers credit rating before each auction – The rate reset is determined through a Dutch auction, where participants submit orders and Clarity displays the preliminary Clearing Market Rate (CMR) as it is bid down from its predetermined maximum rate in a Dutch auction format. The CMR is continuously updated as new orders are entered – For each bidding order, investors input order size at par and rate, and can cancel their order prior to the Submission Deadline – At the end of the Bid Process, the final CMR becomes the new rate for the security, and orders are filled on a price, then time priority • Secondary Offering Screens – Click to Trade Book <ul style="list-style-type: none"> – Clarity hosts a secondary screen for secondary market trading in the four Clarity securities in-between rate resets – Participants view full depth of market. Orders are predominately priced at par and are live and executable – Participants submit the size and settlement of each sell order and specify the offering as all-or-none or if a minimum trade denomination applies
	Price Formation and Transparency	<ul style="list-style-type: none"> • The level of price transparency differs per trading protocol: <ul style="list-style-type: none"> – Competitive Bid Processing (Dutch Auction): Participants see price and size of all bids as they are entered into the Bid Process as well as the preliminary CMR as is bid down and the final CMR – Secondary Offering Screens (Click to Trade Book): Participants have full visibility of secondary offerings
	Counterparty Protocol	<ul style="list-style-type: none"> • Trade counterparties are privy to execution price and order details, and counterparties remain anonymous • Arbor will act as the riskless counterparty to the buyers and sellers of all trades on the platform • All trades are cleared and settled through the Industrial and Commercial Bank of China (ICBC) • Clarity submits reportable transactions to MSRB's transaction reporting system
	Fee Structure	<ul style="list-style-type: none"> • Platform charges various fees based on trading protocol: <ul style="list-style-type: none"> – Competitive Bid Processing (Dutch Auction): Platform charges negotiable annual fees to the issuers of bonds for resetting bonds – Secondary Offering Screens (Click to Trade Book): No fees • Data fees/Additional service fees: None • Incentives/Rebates: None

Clarity BidRate – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities) and trader level – Access: Each participant has an individual login to access the platform – If an participant has multiple accounts, they can bid separately in each account – Each participant provides Clarity with a list of authorized traders and can specify additional groupings and/or permissioning restrictions – Participants and ICBC can set credit limits – Clarity has the ability to remove participants from the platform that exhibit unethical or prohibited behavior Global kill switch: Clarity has the ability to terminate all ongoing trading on the platform, can eliminate incorrect bids (fat finger mistakes), and can re-run auctions Participant imposed limits: None
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: None Clarity provides participants with a blotter of all trades on the platform Trade data from the system is available on an anonymous basis to all platform participants
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – Participant approval is handled on a case-by-case basis – Participants trading B-TOBs must have placement letters KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: Yes; participants must onboard with ICBC
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices/monitoring capabilities: Monitored; Clarity’s Subscriber Agreement includes rules aimed at hindering abusive trading practices Off-market trade review/erroneous trade policy/trade dispute: Yes; Clarity has a framework in place to address erroneous trades, and Clarity’s subscriber agreement includes rules for handling trade disputes
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

Clarity BidRate – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> • Platform UI and protocols supported: <ul style="list-style-type: none"> – Web-based and has an open-architecture with the ability to customize screens for participants – API is provided
	Integration Capabilities	<ul style="list-style-type: none"> • OMS and other system integrations: Platform provides STP to ICBC
	Data Security and Platform Reliability	<ul style="list-style-type: none"> • Disaster recovery plans and systems: <ul style="list-style-type: none"> – Primary system: Third-party servers through Ipreo in New York – Secondary system: Yes; Located in Virginia and Illinois
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> • Technology and Integration: <ul style="list-style-type: none"> – Plans to integrate with OMS and other front-end integrations • Products and Participants: <ul style="list-style-type: none"> – Clarity expects the B-VRDO to be the first security issued on the platform when Clarity launches trading operations
	Additional Notes and Comments	<ul style="list-style-type: none"> • None

PLATFORM IS NOT YET LAUNCHED: Therefore all content described is suppositional



CodeStreet: CodeStreet Dealer Pool Platform Details

CodeStreet Dealer Pool

Phone: 646.442.2800

Address: 200 Park Ave, 17th Floor, New York, NY 10166

Parent Firm	Platform Type	Product(s)	Category
Private – Market Participant Ownership	Dealer to Dealer	Corporate Bonds (HY and IG)	Not Yet Operational Technology Provider

Platform Overview

CodeStreet is a software company that provides sales and trading software solutions for fixed income products, including a workflow solution called Teamwork. CodeStreet plans to leverage Teamwork’s trade data in order to match trades for Dealer participants via an electronic trading platform called CodeStreet Dealer Pool (“CDP”), which will facilitate Corporate Bond trading through a dark pool and matching sessions. CodeStreet plans to integrate with a partner in the near future in order to launch the platform.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: CodeStreet LLC, founded in 2003. The firm has investments from a Dealer (market participant) and a PE firm • Platform entity: CodeStreet LLC, platform anticipated to launch at a future date (not disclosed) • FTE: 32 total; Split between functions supporting current software products and the new trading platform • MPID: N/A
	Type of Platform <ul style="list-style-type: none"> • Platform category: Two protocols (1) Dark Pool and (2) Matching Sessions (Real-Time Matching) • Dealer to Dealer platform that is fully anonymous
	Target Participants <ul style="list-style-type: none"> • Targets Dealer participants • Number of participants: N/A – platform has yet to formally launch • Number of active participants: N/A – platform has yet to formally launch
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: US Fixed Income markets • Product(s) traded: Trades HY and IG Corporate Bonds (registered and unregistered 144A) • Trade size(s): Round lot and block sizes
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • CodeStreet plans to integrate with a partner who will assume responsibility for registration, execution, and ATS formation • ATS registered and entity: N/A • Broker Dealer registered and entity: N/A • Regulator(s): N/A • Other licenses: None
	Other Services <ul style="list-style-type: none"> • Other chargeable data services/add-ons: <ul style="list-style-type: none"> – Teamwork: Pre-trade workflow desktop application used by Fixed Income Dealer participants to collaborate with clients by integrating multiple data sources, including client portfolios, trade axes, customer inquiries, and market data. Teamwork participants can determine if they would like to participate on CDP – CodeStreet Replay: Provides an environment for trade simulations, allows users to ‘replay’ market data scenarios, and support compliance, internal audit, and regulatory requirements with records of trading activity – CodeStreet Integrator: Allows users to aggregate information from multiple sources into applications on a user’s terminal • Treasury spotting capabilities: Yes; CodeStreet expects to offer through the partner • Treasury hedging capabilities: Yes; CodeStreet expects to offer through the partner

CDP – Platform Characteristics (1/2)

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>Platform hosts two trading protocols that allows Dealers to trade anonymously within a Dark Pool or Matching Sessions. Both protocols consolidate data and activity from the Teamwork workflow product to identify potential securities and participants. The trade size minimum for both protocols will be \$1mm for IG securities and \$250k for HY securities</p> <ul style="list-style-type: none"> • Dark Pool <ul style="list-style-type: none"> – CDP monitors participant’s activity on the Teamwork workflow application. CDP automatically and anonymously matches opposing interest in specific securities based on participant activity on Teamwork – When a matching interest occurs, both counterparties receive a notification that remains on the platform until either participant agrees to initiate negotiation (no expiration) – Once counterparty engages in the negotiation, there will be a set response time for the opposing counterparty to engage – If both counterparties engage, they will be given the option to bilaterally and anonymously negotiate price and size – CDP provides TRACE ticker information along with suggested bid-ask prices for the security to both counterparties and suggested pricing is determined through data inputs from TRACE, IDB, ATS, and other market pricing sources – If only one counterparty improves on the spread provided by platform, the other counterparty will not see the submitted price unless they also improve on the spread (to prevent information leakage) – If both counterparties agree on a price, the trade will execute at the negotiated price with the help of the partner • Matching Sessions (Real-Time Matching) <ul style="list-style-type: none"> – CDP initiates security-specific Matching Sessions at a CDP-determined midpoint price (MP) based on information collected from multiple data sources, including the Teamwork application, trading history, and participant inquiries – Once CDP sets the MP for the securities, participants can submit firm and executable orders at the given price – Orders are matched by time priority throughout the session • A key feature of the CDP platform will be a participant-specific rating generated by CDP. If a counterparty withdraws from a proposed trade prior to that trade’s execution, the participant will receive a negative rating that is visible to all other participants on the platform and vice-versa
	Price Formation and Transparency	<ul style="list-style-type: none"> • Level of price transparency differs by protocol: <ul style="list-style-type: none"> – Dark Pool: Participants see recent TRACE and system-suggested prices. Negotiating parties see counteroffers if both sides improve on the bid-ask spread in the negotiation – Matching Session: Participants see CDP-determined prices

CDP – Platform Characteristics (2/2)

Topic		Details
Platform Characteristics	Counterparty Protocol	<ul style="list-style-type: none"> • Trade counterparties are fully anonymous throughout the entire trade process within each protocol • The partner will act as the riskless counterparty to the buyers and sellers of all trades on the platform, and all trades will be cleared and settled through the partner
	Fee Structure	<ul style="list-style-type: none"> • Platform charges non-negotiable transaction fees: No further information provided • Data fees/Additional service fees: None • Incentives/Rebates: None

CDP – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities), trader, and book level – Access: Each participant has individual logins to access the platform – Order limits will be established by CDP and the partner – System will have fat finger checks in place that participants can override if necessary Global kill switch: Yes; Platform can cancel all open orders at the platform, participant, security, and book level. In addition, participants can cancel all of their open orders Participant imposed limits: Yes; Participant limits will be handled on a case-by-case basis
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: None
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: CodeStreet evaluates potential participants on a case-by-case basis KYC/AML procedures: <ul style="list-style-type: none"> – Structure: Will be outsourced to the partner – Clearing firm onboarding and procedures: Yes; Will be handled by the partner’s clearing house
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices/monitoring capabilities: Monitored, by the partner Off-market trade review/erroneous trade policy/trade dispute: Yes, at the discretion of the partner
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

CDP – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> Platform UI and protocols supported: Not disclosed
	Integration Capabilities	<ul style="list-style-type: none"> OMS and other system integrations: <ul style="list-style-type: none"> Integrates with several OMS/EMS Performs STP to its partner Bid-list processing: N/A
	Data Security and Platform Reliability	<ul style="list-style-type: none"> Disaster recovery plans and systems: <ul style="list-style-type: none"> Primary system: Third-party servers Secondary system: Yes Infrastructure to prevent information leakage within the firm and external: Yes
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> Technology and Integration: <ul style="list-style-type: none"> Plans to integrate with a partner for trade execution, clearing, and ATS purposes Products and Participants: <ul style="list-style-type: none"> Plans to expand to EMEA for current clients of other CodeStreet software solutions
	Additional Notes and Comments	<ul style="list-style-type: none"> None

PLATFORM IS NOT YET LAUNCHED: Therefore all content described is suppositional



DelphX ATS Platform Details

DelphX ATS

Phone: 610.640.7546

Address: 5 Great Valley Parkway, Malvern, PA 19355

Parent Firm	Platform Type	Product(s)	Category
Private – Independent	All to All	Corporate Bonds (HY and IG)	Not Yet Operational Trading Platform

Platform Overview

DelphX currently publishes real-time pricing for over 25,000 Corporate Bonds through their MAV \equiv n product. The company plans to launch its DelphX ATS, a secure OTC trading and communication network, to facilitate confidential All to All interaction through encrypted digital communication of interests, quotes, queries, orders, RFQs and instant messages.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: DelphX LLC, founded in 2011 • Platform entity: DelphX ATS, platform anticipated to launch in Q1, 2016 • FTE: 7 total • MPID: N/A
	Type of Platform <ul style="list-style-type: none"> • Platform Category: Platform facilitates three trading protocols (1) E-RFQ, (2) LOB/QS, (3) Auction. All three have the option to trade on a disclosed or fully anonymous base
	Target Participants <ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants • Number of participants: N/A – platform has yet to formally launch • Number of active participants: N/A – platform has yet to formally launch
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: US Fixed Income markets • Product(s) traded: Corporate Bond trades (registered, unregistered 144A, and Reg-S) and single-name CDS • Trade size(s): Odd lot, round lot, and block trades
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • Affiliated DelphX Services Corporation (“DSC”) is a FINRA member firm and regulated entity • ATS registered and entity: Pending Form ATS to be submitted by DSC • Registered Broker Dealer and entity: DSC • Regulator(s): FINRA & SEC • Other licenses: None
	Other Services <ul style="list-style-type: none"> • Other chargeable data services/add-ons: DelphX offers stand-alone data and reference pricing/indexing services through MAV\equivn, a real-time pricing feed/tool launched in June 2013 that currently has 17 subscribers <ul style="list-style-type: none"> – MAV\equivn calculates a forecasted price based on a combination of active Dealer quotes, confidential market data, and proprietary algorithms; it is continuously updated throughout the trading day and will be displayed throughout the DelphX ATS • Treasury spotting capabilities: None • Treasury hedging capabilities: None

DelphX ATS – Platform Characteristics (1/2)

Topic	Detail
Platform Characteristics Trading Procedures and Protocol	<p>Platform supports multiple trading and communication protocols that facilitate finding eligible counterparties possessing complementary interests on a Lit (disclosed) or Dark (fully anonymous) basis.</p> <ul style="list-style-type: none"> • Platform will categorize all participants as Market Makers (“Makers”) and Market Takers (“Takers”). All Dealers will be Makers and Buy-Side participants may be categorized as either depending on their level of liquidity contribution • LOB/QS <ul style="list-style-type: none"> – Makers can utilize the system’s confidential quote communication system to stream Level-1 quotes to all Takers and other Makers and recipient-specific Level-2 quotes to individual or to selected groups of Takers (and/or Makers), as determined by the Maker – Quotes include: CUSIP, price, size, and direction – Level-1 quotes are Maker-initiated and displayed to all Takers and other Makers – Level-2 quotes are Maker-initiated and displayed to the recipient(s) they select and, as with phone-based trading, the price, size and terms of each Level-2 quote for a given security may be varied by the Maker on a recipient-specific basis – Each Taker’s display for a given security contains all current Level-1 quotes posted for that security, and all Level-2 quotes transmitted by Makers specifically to that Taker – Each quote is subject to bilateral negotiation • E-RFQ <ul style="list-style-type: none"> – All Takers can transmit RFQs to individual, selected groups and/or all Makers simultaneously for individual or lists of securities – Each RFQ includes: price, size, direction, and can be for single or multiple securities, and a customizable expiration time – The initiator can see quotes as submitted, and can respond prior to the expiration if they choose • Auction <ul style="list-style-type: none"> – Takers can confidentially schedule and conduct private auctions to buy or sell a given CUSIP and invite specific Makers to participate – The initiating Taker can customize the starting time and expiration time for the auction – Makers can submit/adjust bids that are visible to all other bidding Makers – At the close, the initiating Taker either accepts or rejects the results of the auction – If accepted, all in-the-money bids are filled at the least attractive “crossing” bid price– as in a single-price Dutch auction • Additional Functionality: Makers have the ability to effectively access Takers’ balance sheets and maintain the option (but not the obligation) of deploying latent market supply and demand in the future through DelphX’s “Cached Inventory” contracts. <ul style="list-style-type: none"> – At initiation of the contract, the Taker agrees to purchase or sell a specified amount of a security (or group of securities) at a defined spread or dollar price. Thereafter, the Maker holds the contractual right to release the pending transactions) in the future; the duration of that right, the price, and incremental proportions having been confidentially negotiated by the Cache counterparties – Takers are incentivized to enter into Cached Inventory contracts because they have the opportunity to receive better transaction pricing and other negotiated incentives that generate alpha – Cached Inventory contracts are private arms-length contracts negotiated among Makers and Takers and confidentially administered by DelphX. DelphX holds that these contracts are not considered to be regulated financial instruments (i.e. Options, Futures)

DelphX ATS – Platform Characteristics (2/2)

Topic		Detail
Platform Characteristics	Price Formation and Visibility	<ul style="list-style-type: none"> All participants have access to view MAV=n pricing within all protocols The level of counterparty transparency depends upon whether the sender of the message, order or quote has elected to be Lit (attributed) or Dark (anonymous): <ul style="list-style-type: none"> – LOB/QS: Takers can see all Lit and Dark Level 1 quotes, and all Level 2 quotes they are permissioned to view – E-RFQ: Takers can see only RFQs they initiate; Makers can see only RFQs that are sent to them. Winning and losing respondent are notified – Auctions: All Makers invited to an auction can see all bids as they are submitted in real-time
	Counterparty Protocol	<ul style="list-style-type: none"> DelphX will select a single third party Clearing Counterparty (the “DCC”), to act as the riskless counterparty for all trades on the platform and through which all trades will be cleared and settled Only the prospective counterparties are privy to trade negotiations. Once a trade has been agreed, its details are reported in real-time to the DCC for execution, clearance and settlement and transparently displayed in all applicable DelphX ATS screens, and also posted to the subject security’s permanent Market Record Both immediate and “cached” future transactions can be negotiated within the DelphX ATS: <ul style="list-style-type: none"> – Immediate trades: Once the trade terms are mutually agreed by the parties, a detailed Trade Report is transmitted to the counterparties and the DCC, which concurrently executes, clears and settles a purchase transaction with the seller and a sale transaction with the buyer – Cached Inventory: Once the terms of the pending future transaction (and the terms of the cache in which it will be held by DelphX) have been agreed by the counterparties, the pending transaction is placed in the DelphX Cache Repository and a Cache Confirmation is transmitted to the cache counterparties in real-time. Upon the Maker’s release of the cached transaction (in whole or in part), a Trade Report confirming the resulting trade is transmitted to the counterparties and the DCC - prompting the DCC to execute, clear and settle a purchase transaction with the seller and a sale transaction with the buyer Prospective Maker and Taker counterparties are known to each other except when a counterparty elects to be anonymous Cached Inventory counterparties have continuous access to real-time status of all their Cached Inventory contracts
	Fee Structure	<ul style="list-style-type: none"> DCC collects a volume-based single-sided markup or mark-down from the Taker in each transaction Fixed subscription fees of \$5k per month are charged to non-trading participants for access to all weighted mid-point pricing of active issues, continuous MAV=n pricing forecasts for illiquid issues and all related market data Data fees/Additional Service fees: Monthly Cached Inventory administration fees: equal to 0.25bps times the aggregate-mean total of their Cached Inventory outstanding during the month Incentives/Rebates: Makers incur no transaction fees

DelphX ATS – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the participant level (onboarded entities) – No trade-size or other limitations are imposed, as interaction among the Maker and Taker counterparties is determined solely by mutual agreement Global kill switch: Yes Participant imposed limits: Participants can set S=ntinel filters to specify preferred quotes, orders, events, and conditions; only relevant conditions and events meeting those specifications will be posted to the participant’s book, and/or trigger a participant-specified alert message
	Client Reporting Capabilities	<ul style="list-style-type: none"> Best execution analysis/TCA: Offers optional access to real-time TRACE data and other relevant market information, as well as comprehensive TCA and Best Ex analytics, at no additional charge DelphX will record all quotes, orders and communications transmitted within the DelphX ATS and will securely store records Details of the agreed terms of all current transactions will be reported in real-time to the respective counterparties (and to FINRA TRACE on behalf of FINRA member firm counterparties) Details of the agreed terms of all Cached Inventory contracts will be securely stored in the DelphX Cache Repository and respective counterparties will be continuously updated as to current pricing and remaining balances
	Subscriber Eligibility	<ul style="list-style-type: none"> Specific criteria for subscriber eligibility: Makers must be either a FINRA member firm or meet minimum market making volume requirements and all participants must have established and maintain a current trading relationship with the DCC KYC/AML procedures: As specified by the DCC
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> Abusive trading practices and monitoring capabilities: As specified by the DCC Off-market trade review, erroneous trade policy, trade dispute: As specified by the DCC
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> None

DelphX ATS – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> • Platform UI and protocols supported: <ul style="list-style-type: none"> – Customizable web-based interface – Supports FIX 4.4 messaging, in addition to HTML5, DelphX API, OpenFin, Symphony and other third-party networks and protocols
	Integration Capabilities	<ul style="list-style-type: none"> • OMS and other system integrations: <ul style="list-style-type: none"> – DelphX can provide integration to any encrypted technology, and the DelphX ATS will be integrated as a portal within Symphony and other secure securities focused networks – STP is provided both by DelphX and third-party vendors • MAV\inn benchmark pricing functionality, along with derived pricing data sourced from the DelphX ATS, will be available for private-label services to pricing and reference data providers and Dark-Pool trading platforms • Bid-list processing: None
	Data Security and Platform Reliability	<ul style="list-style-type: none"> • Disaster recovery plans and systems: <ul style="list-style-type: none"> – Primary system: Third-party servers provided by CISCO Disaster Recovery System – Secondary system: Yes • DelphX has multiple datacenters for redundancy located in the Northeast region of the US; can connect through VPN • If a network connection is temporarily lost (despite redundant facilities), the voice-based contact information of the communicating counterparties and status of all current negotiations is continuously displayed to facilitate interim communication via telephone
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> • Technology and Integration: <ul style="list-style-type: none"> – Comprehensive TCA, Best Ex, and other applications utilizing the quotes and pricing metrics communicated within DelphX • Products and Participants: <ul style="list-style-type: none"> – Expanding to 20 FTEs, primarily consisting of Sales Reps and Developers by Q2, 2016 – Expansion of coverage to other OTC asset classes and geographic regions – Streaming reference-pricing, curves, indexes, and other data-related products • Fund Raising: <ul style="list-style-type: none"> – DelphX is in the process of raising additional operating capital to invest in sales and marketing, but plans to maintain independence and neutrality and cannot include major fixed income market makers among its equity holders
	Additional Notes and Comments	<ul style="list-style-type: none"> • None

PLATFORM IS NOT YET LAUNCHED: Therefore all content described is suppositional



ICAP: I-SAM Platform Details

ICAP: I-SAM

Phone: 212.732.6900

Address: 1100 Plaza Five, Jersey City, NJ 07311

Parent Firm	Platform Type	Product(s)	Category
Public	All to All	Corporate Bonds (HY and IG)	Non Yet Operational Trading Platform

Platform Overview

ICAP is a European-based electronic trading company that trades in a variety of products in multiple regions around the world. ICAP's I-SAM (ICAP Sponsored Access Matching) platform will offer Buy-Side participants (through their selected sponsoring Dealers) access to ICAP's Inter-Dealer Corporate Bond Matching Sessions. The sponsoring Dealer will allow the Buy-Side participant to enter orders and trade on the platform directly. Trading will be conducted in anonymous matching sessions for Corporate Bonds. ICAP will launch US Corporate Bond trading via Matching Sessions between Dealer participants prior to launching I-SAM.

Topic	Details
Platform Summary	Corporate Structure & Additional Details <ul style="list-style-type: none"> • Parent name: ICAP plc, founded in 1986 • Platform entity: ICAP Corporates LLC, platform anticipated to launch in Q2, 2016 • FTE: 12 total; Split between product groups. Platform leverages parent infrastructure for support • MPID: GARE
	Type of Platform <ul style="list-style-type: none"> • Platform category: Matching Sessions (Real-Time Matching) • All to All platform that is fully anonymous
	Target Participants <ul style="list-style-type: none"> • Targets Buy-Side and Dealer participants • Buy-Side participants gain access to platform through one or more Dealer sponsorships • Number of participants: N/A – platform has yet to formally launch • Number of active participants: N/A – platform has yet to formally launch
	Product and Market Focus <ul style="list-style-type: none"> • Product geography: US Fixed Income markets • Product(s) traded: HY and IG Corporate Bonds (only registered) • Trade size(s): Round lot
	Registrations and Regulatory Oversight <ul style="list-style-type: none"> • ATS registered and entity: Yes; ICAP Trading System (ICAP Corporates LLC) • Registered Broker Dealer and entity: Yes; ICAP Corporates LLC (a subsidiary of ICAP plc) • Regulator(s): FINRA, SEC, and FCA (ICAP plc) • Other licenses: None
	Other Services <ul style="list-style-type: none"> • Other chargeable data services/add-ons: None • Treasury spotting capabilities: Yes; via ICAP's BrokerTec platform • Treasury hedging capabilities: Yes; via ICAP's BrokerTec platform

ICAP: I-SAM – Platform Characteristics

Topic		Details
Platform Characteristics	Trading Procedures and Protocol	<p>Platform hosts anonymous Matching Sessions where orders are matched in real-time:</p> <ul style="list-style-type: none"> • ICAP determines the schedule for each matching session, that includes a list of securities with their corresponding mid-point prices (MP) <ul style="list-style-type: none"> – ICAP hosts two types of matching sessions: (1) scheduled Matching Sessions based on product type (HY, IG) and (2) impromptu Matching Sessions based on news/events and participant interest – Securities for each Matching Session are determined at ICAP’s discretion – Matching Sessions occur multiple times per day at ICAP’s discretion and is based on industry sector – ICAP determines the MP for each security through an algorithm that includes data from prior trades, market data providers (Interactive Data Corporation, TRACE, Markit), last trade price from similar bonds, and internal sources • A Matching Session has the following procedures: <ul style="list-style-type: none"> – 5 minutes prior to a session, participants on the platform have the opportunity to upload a list of securities onto the I-SAM platform – Participants can then decide which securities to trade from this uploaded list of securities – 30 seconds before a session begins, I-SAM announces the MP for each security in the session – A participant can then choose the securities and order size to include in the matching session – After the session begins, participants can enter new orders at any time, either individually or all at once – Throughout the session, participants can update the order size and cancel any live orders (prior to being matched) – Matching sessions are 5 minutes long and orders are live and executable – All trades are executed at the pre-determined MP on a time priority throughout the session – Minimum order size: IG is \$1mm and HY is \$500k
	Price Formation and Visibility	<ul style="list-style-type: none"> • Buy-Side and Dealers do not have transparency of market activity during a session. Participants only know details of their own executed trades • All participants on the platform will only see the MP for listed securities and no additional information
	Counterparty Protocol	<ul style="list-style-type: none"> • The Buy-Side chooses a sponsoring Dealer from the I-SAM platform that they want to execute with; Buy-Side must establish each Dealer relationship independently of I-SAM and Dealer must authorize Buy-Side to participate • The Buy-Side enters the platform anonymously and the sponsoring Dealer is only notified when a trade is executed by its sponsored participant. Trade details are disclosed to trading counterparties and to sponsoring Dealers • ICAP will act as the riskless counterparty to buyers and sellers of all trades on the platform, and all trades are cleared and settled through ICAP

ICAP: I-SAM – Platform Characteristics

Topic		Details
Platform Characteristics	Fee Structure	<ul style="list-style-type: none"> • Platform charges negotiable transaction fees: <ul style="list-style-type: none"> – Fees are dual-sided, mark-up and mark-down – Each Dealer has a custom brokerage schedule with ICAP: <ul style="list-style-type: none"> ▪ Sponsoring Dealers charge the Buy-Side a mark-up/mark-down to execute on platform ▪ Fee agreement between the Buy-Side and the sponsoring Dealer is negotiated independently of I-SAM – All transaction fees are included in the price of the trade • Data fees/Additional service fees: No • Incentives/Rebates: Yes; ICAP provides incentives based on participation level and thresholds

ICAP: I-SAM – Platform Risk, Reporting, and Compliance

Topic		Details
Platform Risk, Reporting, and Compliance	Platform Controls, Trade Controls, and Permissioning	<ul style="list-style-type: none"> • Platform imposed risk management procedures, controls, and checks: <ul style="list-style-type: none"> – Permissioning: Controlled at the Dealer and Buy-Side participant level (onboarded entities) and trader level – Access: Each participant has their own login to access the platform. Buy-Side candidates have their own login and can match during the matching session, but must execute with a sponsored Dealer – Platform has controls around each security to prevent submissions on off-market orders and prevent fat finger errors – Platform prompts a participant for confirmation when an order is 5 ticks from the last executed trade. Platform prevents entering orders more than 10 ticks away from the last executed trade – I-SAM has overall credit limits in place for each sponsoring Dealer • Global kill switch: Yes; Platform can cancel all orders at the platform and security level. In addition, participants on the platform can cancel all of their open orders • Participant imposed limits: Yes; Sponsoring Dealer set credit limits for each Buy-Side participant and informs I-SAM of these limits
	Client Reporting Capabilities	<ul style="list-style-type: none"> • Best execution analysis/TCA: None • For each executed trade, Dealers will receive an information package with trade details • I-SAM keeps records of all activity on the platform, i.e., interest, executions, orders placed, and key strokes
	Subscriber Eligibility	<ul style="list-style-type: none"> • Specific criteria for subscriber eligibility: <ul style="list-style-type: none"> – All sponsoring Dealers on the I-SAM platform are onboarded to ICAP; Dealers already onboarded with ICAP are eligible to trade on I-SAM – All sponsored participants on the I-SAM platform are onboarded through one or more sponsoring Dealer that is already on the platform – Sponsoring Dealers must be FINRA registered • KYC/AML procedures: <ul style="list-style-type: none"> – Structure: In-house – Clearing firm onboarding and procedures: N/A; ICAP self-clears Corporate Bond trades
	Trade Dispute and Erroneous Trade Policies	<ul style="list-style-type: none"> • Abusive trading practices and monitoring capabilities: Monitored • Off-market trade review, erroneous trade policy, trade dispute: Yes; Platform follows ICAP’s firm written policies on erroneous trades and trade disputes
	Other Risk, Reporting, and Compliance Items	<ul style="list-style-type: none"> • None

ICAP: I-SAM – Platform Technology and Additional Information

Topic		Details
Platform Technology	Software, User Connectivity, and Communication Protocols	<ul style="list-style-type: none"> • Platform UI and protocols supported: <ul style="list-style-type: none"> – Web-based interface in HTML format – Supports FIX 4.4 messaging
	Integration Capabilities	<ul style="list-style-type: none"> • OMS and other system integrations <ul style="list-style-type: none"> – Currently no integration to OMS • Investors have ability to add connectivity to their APIs • Bid-list processing: N/A; Dealers can upload workflow for the day, by sector, or by security through pre-match file uploads that will be executed at the MP
	Data Security and Platform Reliability	<ul style="list-style-type: none"> • Disaster recovery plans and systems <ul style="list-style-type: none"> – Primary system: Owned-hardware – Secondary system: Yes – The platform uses the ICAP I-Cross infrastructure, including system redundancies and co-location safeguards
Additional Platform Information	Short to Medium Outlook	<ul style="list-style-type: none"> • Technology: <ul style="list-style-type: none"> – Plans to develop RFQ functionality for unmatched balances – Integration to several OMS is in development
	Additional Notes and Comments	<ul style="list-style-type: none"> • None