

The background of the slide is a high-angle photograph of the Chicago skyline at sunset. The sky is a mix of orange, pink, and light blue. The city's skyscrapers are illuminated with warm lights, and the Lake Michigan water is visible in the distance. A large, semi-transparent white triangle is overlaid on the left side of the image, pointing towards the center.

The Proven Retail Exchange Operator

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Options

- #1 U.S. options market
- Trading home to SPX and VIX options

Futures

- CFE is an all-electronic, open access market model
- Trading home to VIX futures

European Equities

- #1 Pan-European equities market
- Cboe Europe operates two lit books and two dark books

Equities

- #2 U.S. equities market
- 234 listed ETFs from 41 unique issuers

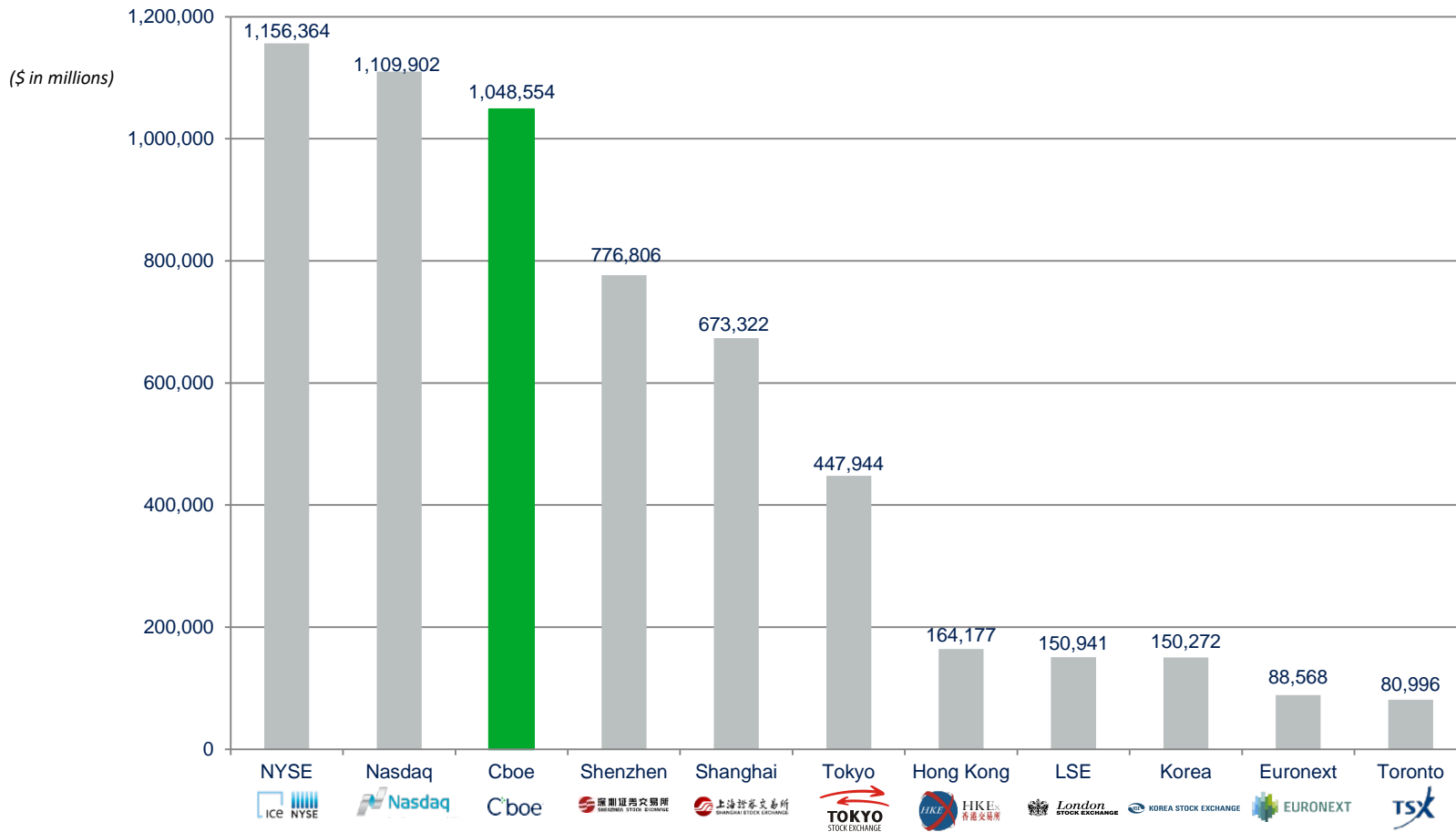
FX

- Well-established ECN for institutional trading
- Spot, Forwards and SEF marketplaces

Cboe is a top global exchange leader

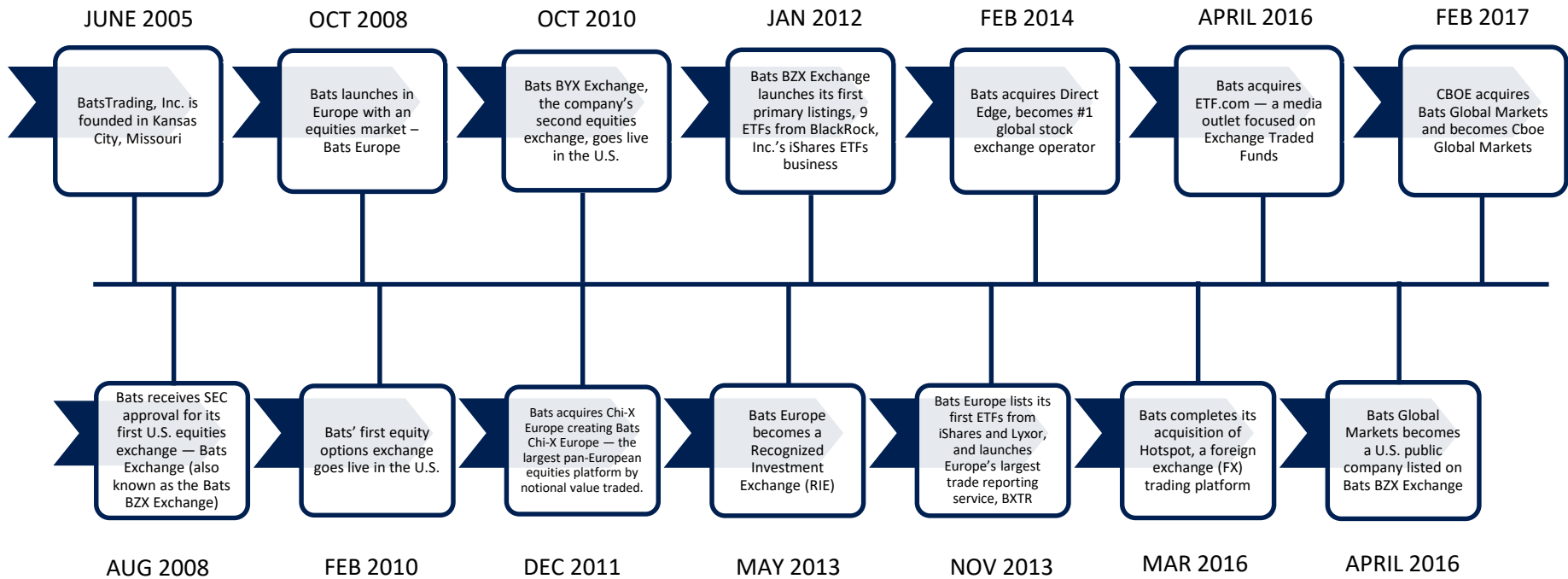


Global Cash Equities Exchanges by Monthly Notional Value Traded



Source: World Federation of Exchanges, Cboe Global Markets.
Notional value traded July 2017.

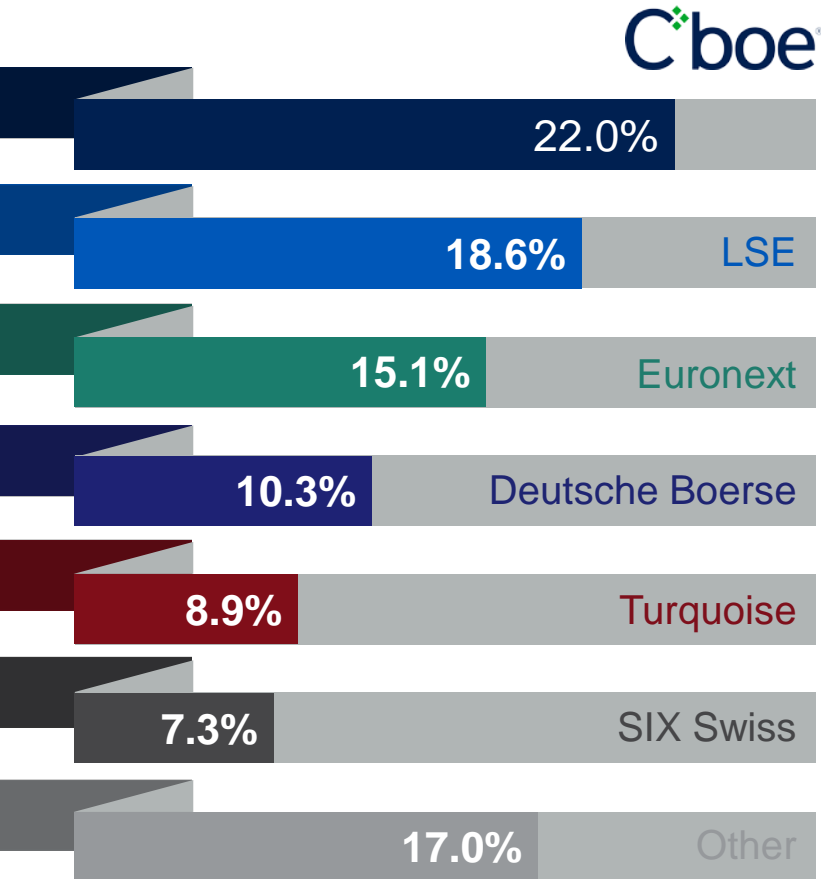
Strong Track Record of Growth



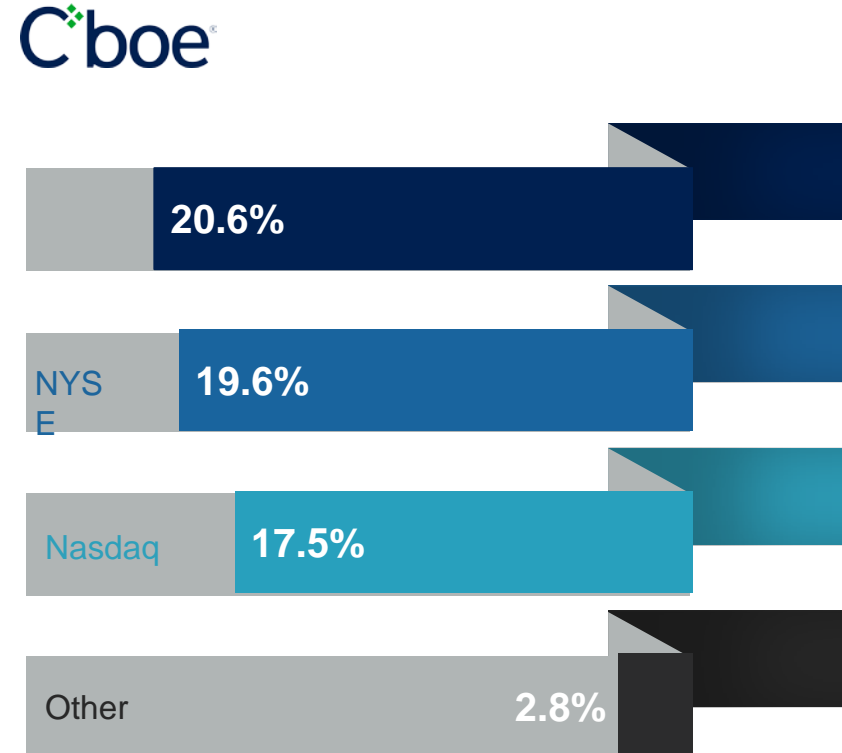
Cboe is the leading exchange in Europe and the U.S.



#1 exchange group in Europe

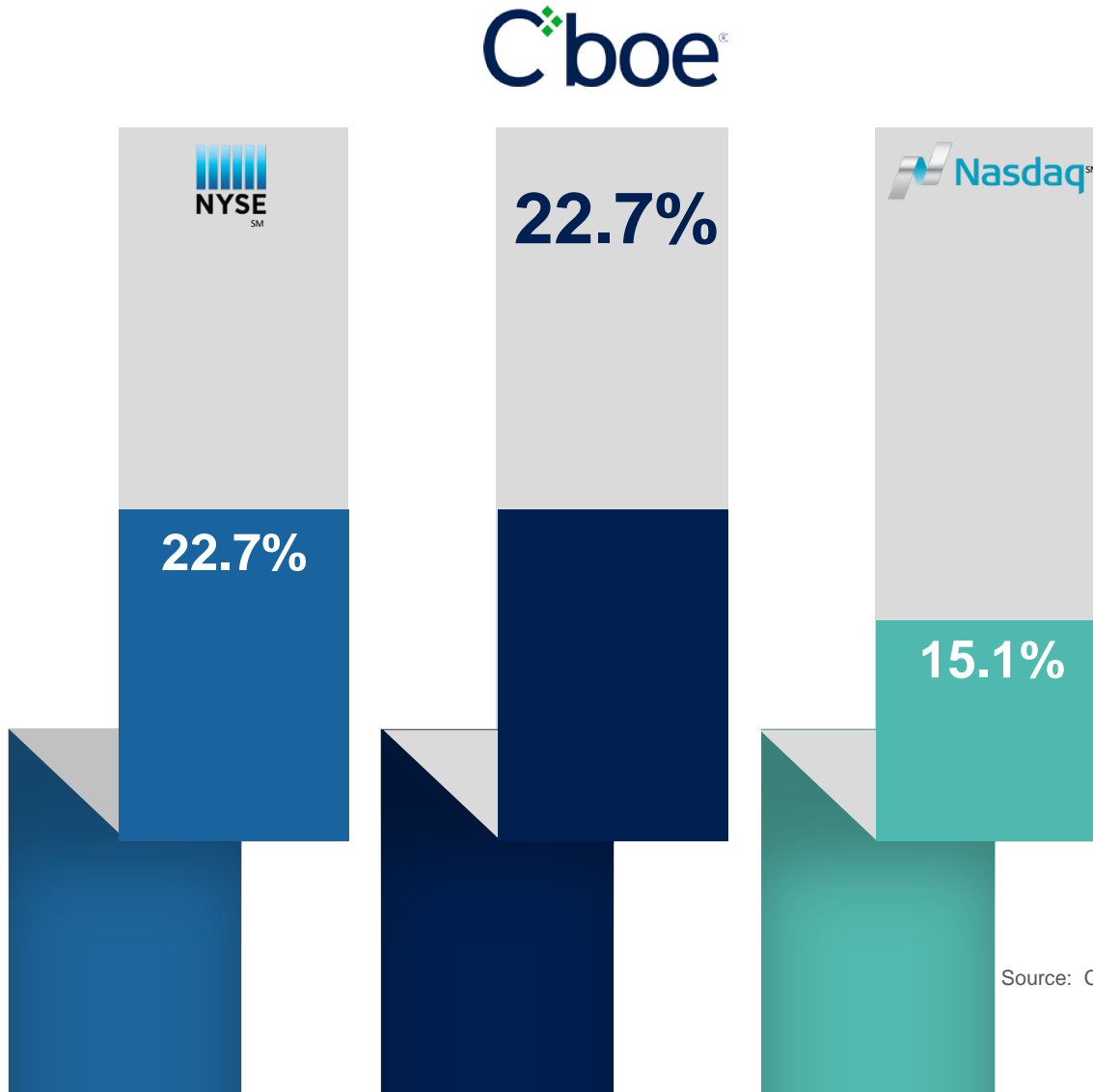


#1 exchange group in U.S. intraday*



Source: Cboe Global Markets, July 2017
*Excluding auction volume.

ETF Market Volume



Source: Cboe Global Markets (ETFMarketplace.com),
5-Day Average 10/27/17.
Includes Volume Traded in the Auctions.

Cboe Four U.S. Equity Exchanges



We operate markets that provide customer choice, various fees and liquidity profiles.

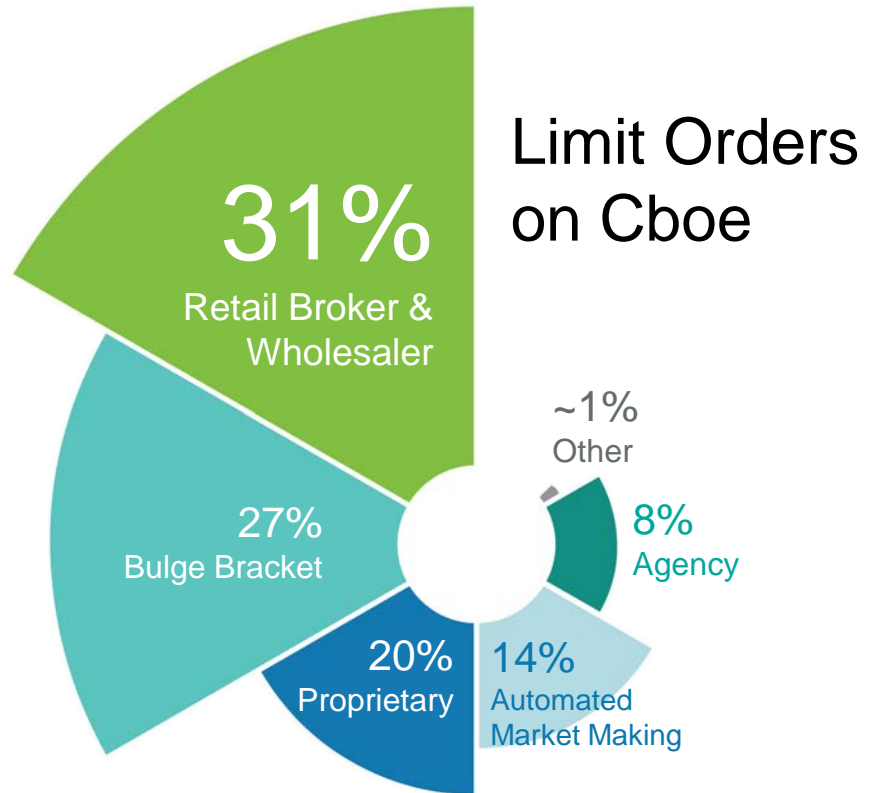
	EDGA	BYX	EDGX	BZX
Key Differentiators	Routing, Low Cost	Retail Price Improvement	Retail, Attribution	Hidden Price Improvement Listing Exchange
Statistics	40 unique strategies	average 30+ mils of price improvement	33% of orders are retail/wholesale; 9% attributed	more than 7% of inbound executed orders receive PI
Recent Market Share¹	1.73%	5.17%	6.33%	6.08%
Pricing Model	Low fee	“Taker-Maker” with low fee and rebates	Traditional “Maker-Taker” model	Traditional “Maker-Taker” model
Pricing for Adding Liquidity	0 to 3	12 to 18	(20) to (35)	(20) to (36)
Pricing for Removing Liquidity	3 to 5	(10) to (16)	30	30
Exchange Code	J	Y	K	Z

¹Cboe Global Markets, June 2017

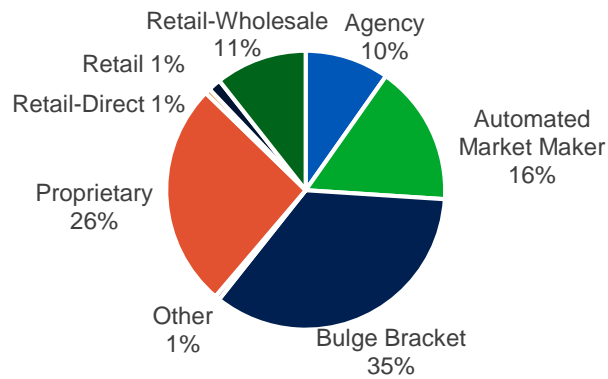
Cboe Is The Top Retail Destination

Retail Broker Limit Order Routing to the EDGX Exchange
 Q2 2016 Rule 606 Reports –
 EDGX Rank Among Exchanges

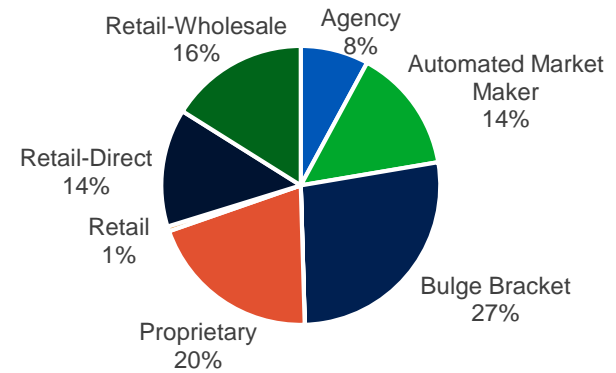
Broker	Cboe is #1	
	NYSE-Listed	NASDAQ-Listed
Fidelity INVESTMENTS	#1	#1
E*TRADE	#1	#1
Scottrade	#2	#2
TD Ameritrade	#1	#1



EDGA, BYX, BZX



EDGX



Source: Percentages represent add and remove volume based on Cboe data for Q2 2017. Cboe categorizes its members into segments on a best efforts basis according to its view of each Member's business model. For definitions of each segment, please click [here](#).

Cboe has an extensive history of working closely with retail broker dealers in support of their customers. Cboe continues to be an industry leader in developing and promoting initiatives alongside retail Members to offer an ever-improving trading experience.

These initiatives include:

- ❖ Functionality and Market Access
- ❖ Unique Retail Pricing Programs
- ❖ Transparency and Reporting
- ❖ Quality of Execution in Liquidity and Price Improvement
- ❖ System Stability and Resiliency
- ❖ First Class Operations and Trading Support
- ❖ Market Structure Advocacy

The Retail Package

The Cboe Exchanges are hosted within Equinix NY4/NY5 campus, home to more equity market share and price discovery than any other data center in the U.S. Limit orders on the Cboe Exchanges are closer in proximity to more non-Cboe markets than competing exchanges operating in Mahwah and Carteret.

The Cboe exchanges are latency equalized across data centers; **No co-location**

- ❖ Hours of operation: 7 a.m. – 8 p.m. ET
- ❖ Orders can be submitted as early as 6 a.m. ET. Cboe will queue the orders until the pre-market session opens at 7 a.m. ET
- ❖ Full Reg NMS protection during the pre/post-market sessions (unlike many of our competitors)
 - Cboe router uses depth of book feeds, not the SIP, for pre/post-market for routing decisions
 - Helps efficiently exhaust liquidity at away destinations while ensuring the best available price



EQUINIX DATA CENTER

Attestation – Cboe developed a retail program around *non-marketable limit orders*:

- ❖ Unique pricing model that acknowledges retail orders and allows retail firms to achieve higher rebates than the standard, non-retail tiered rates.
- ❖ Enables Cboe to build additional retail-focused products (e.g., “RTAL” attribution; tagging retail orders on routable flow [see below])
- ❖ Expand the “retail” category (included the definition of correspondent clearing)

Attribution – Enables liquidity providers to attribute (quote under their own MPID):

- ❖ Benefits retail liquidity providers.
- ❖ Resting retail order flow has value to liquidity takers. By displaying your MPID in data feeds, you provide liquidity takers more transparency, which attracts takers to EDGX
- ❖ Also offer “RTAL” attribution for retail firms that want to quote using a generic identifier

Cboe BYX RPI – A program aimed at providing price improvement for retail Members marketable orders

- ❖ Retail Members control the price improvement they are eligible to interact with (\$.001 increments)
- ❖ Orders executing against resting price improving orders receive a \$.0025 rebate
- ❖ July MTD price improvement is \$.0018/share
- ❖ Orders can be sent book only or routable

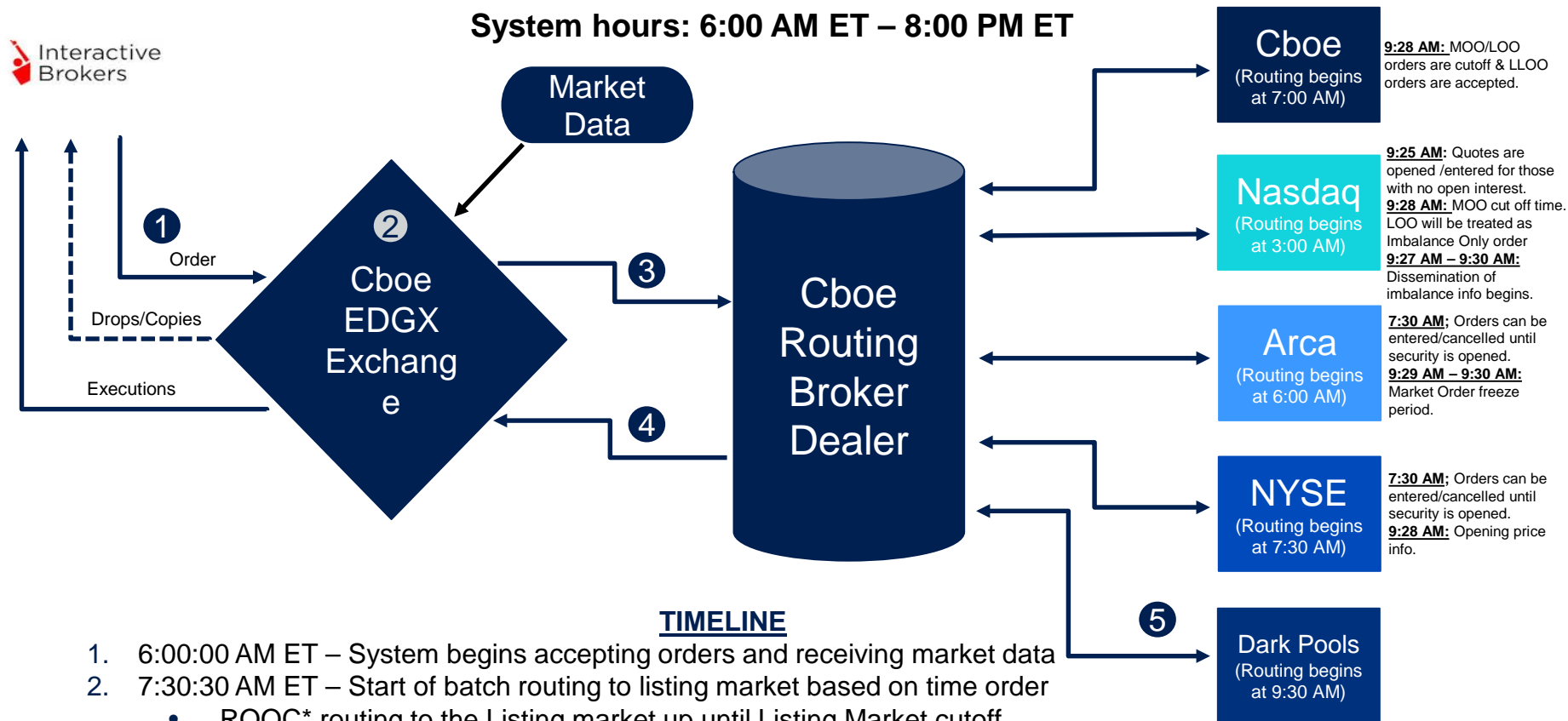
A one-stop solution for orders to partake in the listing venues opening and closing auctions while being able to participate on Cboe intraday.

- ❖ Route to Listing Market (Open, Close and Intra-Day Halts)
- ❖ Choose one exchange to seamlessly manage your flow across all listing market auctions
- ❖ Posts on Cboe intraday
- ❖ Re-routes to listing market after regulatory halts to participate in a stock's reopening (unhalt auction)
- ❖ Re-route functionality can be defaulted at the session level or enabled on an order by order basis

The requirements include:

- ❖ EDGX or BZX order
- ❖ Routable

Routing – Opening



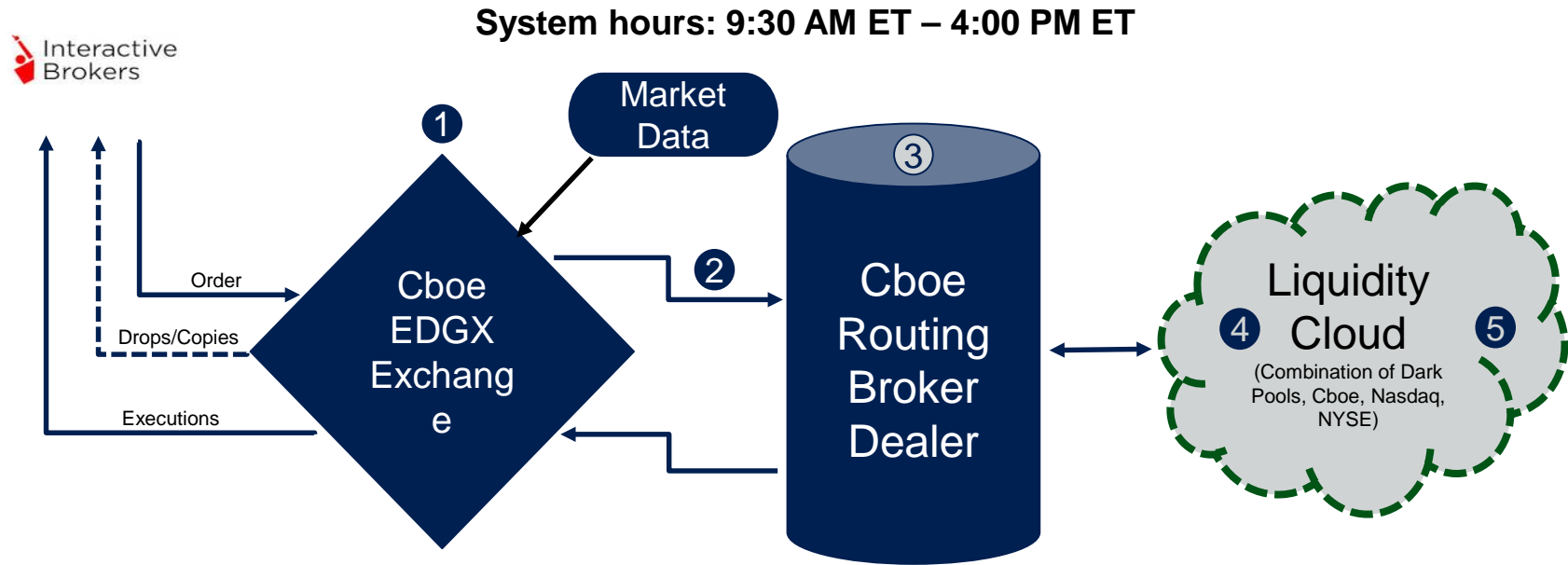
TIMELINE

1. 6:00:00 AM ET – System begins accepting orders and receiving market data
2. 7:30:30 AM ET – Start of batch routing to listing market based on time order
 - ROOC* routing to the Listing market up until Listing Market cutoff
 - Orders that miss the listing market opening cutoff, are posted on EDGX
3. Send down to primary as On Open MKT/LMT (Example MOO/LOO)
 - Individual orders result in individual executions (**not** grouped with other broker dealers for clearing)
4. 9:30:00 AM ET – Post auction, listed market executions are returned to Members, unfilled orders post to EDGX**
5. 9:30:01 AM ET – If routed Aggressive or Super Aggressive (odd lot), route to B/D router + Street

*ROOC = Route to Primary

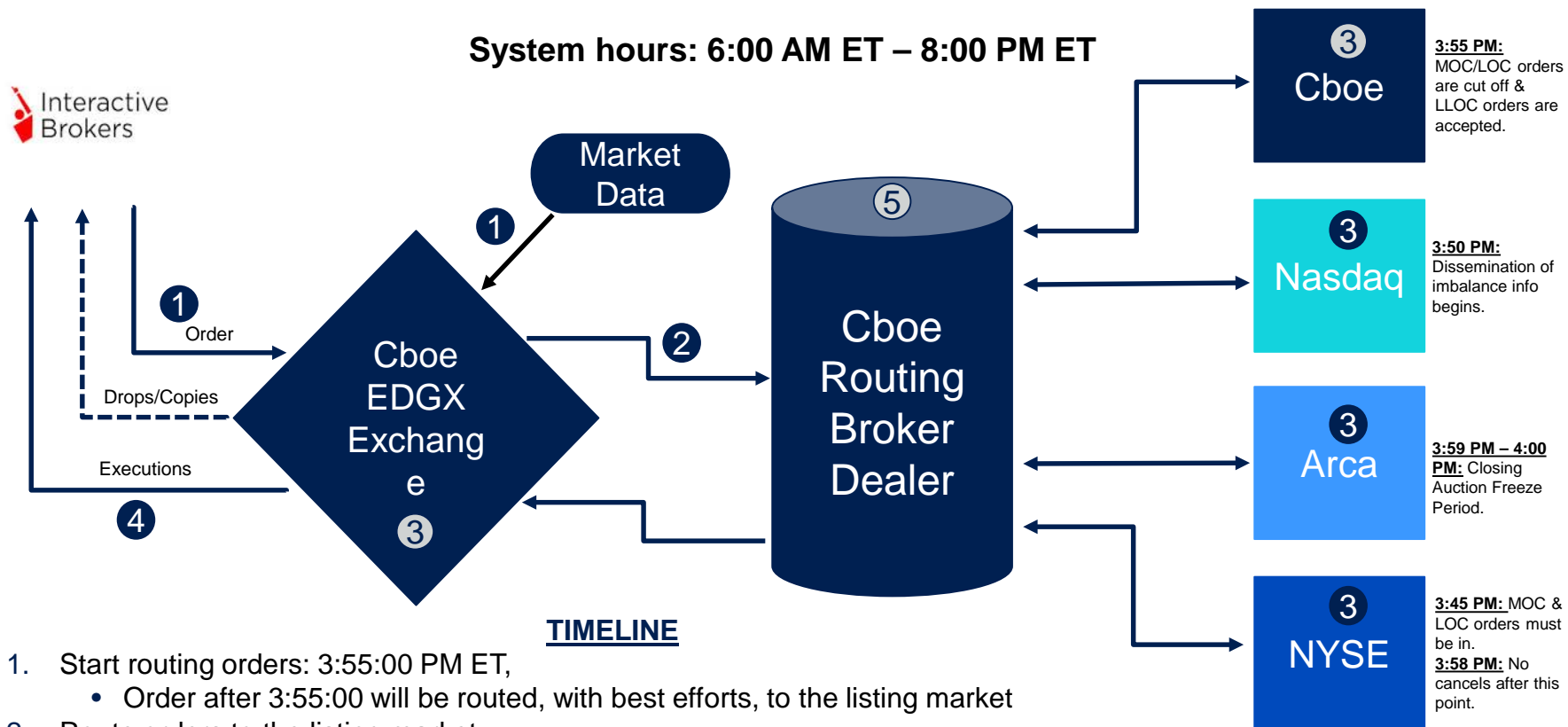
**= Orders receive a new timestamp

Routing – Regular Hours



1. Non-marketable limit orders are posted on EDGX
2. Orders that route out of exchange
 - Marketable in-flight
 - Residual route out
3. Reg NMS routing
 - Route to Improve – Ability to receive price improvement will take priority over speed of execution
 - Route to Fill – Speed of execution will take priority over potential price improvement
4. Price Improvement within the dark
 - Wholesalers, ATS's
5. Displayed Liquidity

Routing – Closing Cross



Cboe introduced a unique way for Retail Orders to be eligible to receive price improvement on outbound marketable orders. If Members (1) designate their orders as retail and (2) are eligible to route, then the orders may be sent to participating dark liquidity providers allowing them to provide the best execution quality possible.

The requirements include:

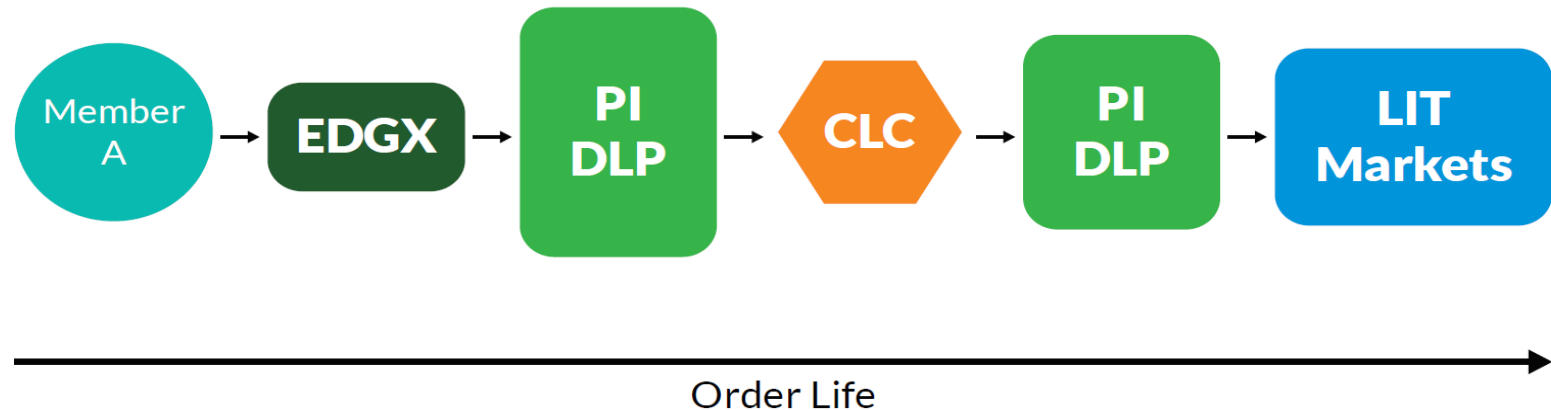
- ❖ EDGX Order
- ❖ Must have an executed retail attestation on file with Cboe
- ❖ Orders must be eligible to route

Features:

- ❖ Orders can be individually marked on an order-by-order basis OR
- ❖ Members can choose to default orders at the port level to ensure all orders are eligible

Note:

- ❖ Members have the ability to opt out of retail routing



Advantages of Retail Routing

- ❖ Access to multiple DLPs looking to provide Price Improvement to retail attested orders
- ❖ Average Price Improvement for marketable orders was \$.003891* in July
- ❖ Lower remove rates for interacting with off exchange liquidity
- ❖ Retail attested orders typically experience a shorter order life time as compared to non-retail orders
- ❖ Retail Routing is available with multiple strategies (ROOC, ROUE, ROUD, ROUT, ROUQ, ROUZ)

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