Refinitiv, an LSEG Business – STAC Summit | Innovation Roundup

Unleashing the value of market data

Patrick Flannery: Group Leader, Low Latency, LSEG



Unleashing the Value of Market Data is Difficult & Costly

Data Processing

Data Sourcing

- Tech Costs cost of maintaining colocation and data storage
- Compliance Costs changing and inconsistent licensing terms
- Quality Issues accuracy, precision, completeness

- Frequent specification changes require ongoing, agile development
- Expertise required to normalize correctly
- Symbology must accommodate time series analysis and disparate data sources
- Data management costs to maintain consolidated data store include HW, SW, and staff
- Legacy infrastructure hampers efficient data processing
- Support resources lack market data depth

Data Analysis

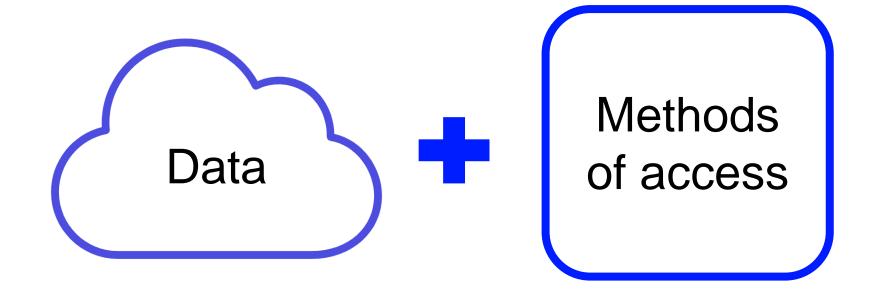
- Understanding data model requires market data and market expertise
- Data processing consumes time better spent generating data-driven insights - slower to insights and frustrated staff
- Analysis building blocks not available - always starting from scratch
- Legacy infrastructure hampers data analysis.
 Move to the cloud has been slow and with hiccups
- Lack of simplification or agility with current models increases cost and complexity of actionable decisions

Decision Making

- Data must be accurate in order to take action on it
- Data driven decision making an issue for profitability and compliance
- Vendor costs may be tied to use cases



What do we offer?



How we make it easy

Programmatic Access to Data

Bellport Enterprise

Low latency market data feed handlers

Data Files

Pcaps, Normalized files, Custom data sets **Queryable Services**

Analytics Workbench

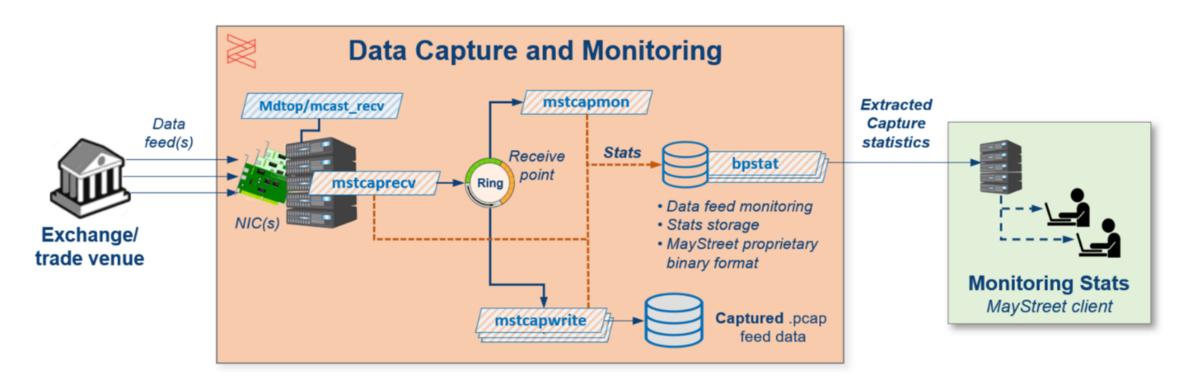
Single digit microsecond latency Consistent normalization across asset classes world wide Files available through SFTP

Clients access MayStreet S3 buckets Optimized for targeted queries (HPQ API) Optimized for big data (Parquet in AWS)

Orchestration getting data out of Data Lake Analytic Environment with Orchestration

Market Data Capture Process

Receiving and storing an incoming data feed, and monitoring the overall capture process



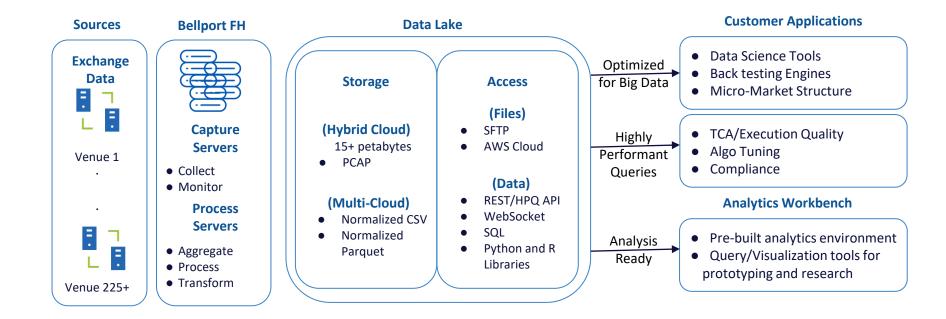
Market Data Lake

MayStreet data store built off of raw PCAP data.

Market data from all major trading venues is captured on performance network hardware with 4-way redundancy. A|B tapes are arbitrated for completeness.

GPS PTP signals ensure highest quality nanosecond-level timestamping.

- Multiple data delivery configurations To meet user need, data is available in real-time, near-time, delayed and/or end-of day scheduling as well as historical data.
- Multiple formats PCAPs, Normalized (Parquet / CSV), Queryable access (HPQ and Workbench)
- Flexible delivery SFTP, Cloud (AWS)



Analytics Workbench

Queryable access to MayStreet and LSEG Data Lake using Python and SQL in an interactive IDE

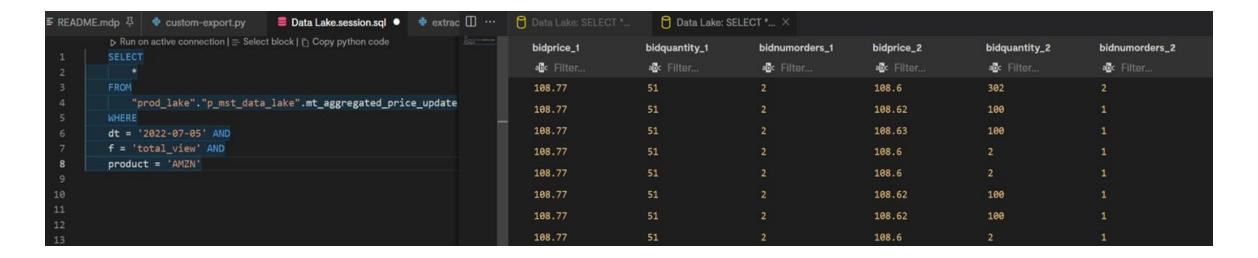
Interactively analyse market data in Jupyter notebooks

Easily spin up Dask clusters and schedule cloud-based Dask jobs to execute processor-heavy data queries.

Build custom services - Using EngineRoom, build custom services/apps running on user-defined servers that can be accessed outside of the Analytics Workbench desktop.

MayStreet high-integrity data - All Analytics Workbench data is sourced from MayStreet's Market Data Lake datasets, renown for nanosecond accuracy and best-in-class integrity algorithms.

Allows you to query the order book for AAPL on NASDAQ at "09:45:00.458398903" on 2022-10-18



Bellport Enterprise

Feed handler library providing low-latency, in-process data ingest, transform and delivery

Written in C++, with Java bindings

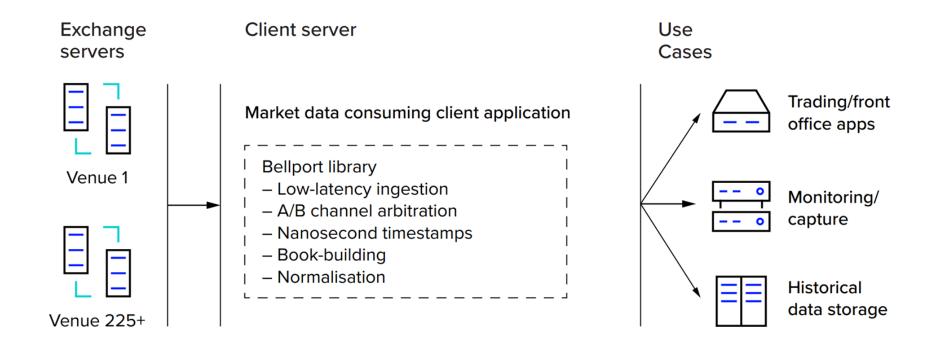
Single high-performance software solution for real-time and historical market data

Clear, transparent, extensible data model

A/B channel arbitration, book building, per-product subscription

Three data access levels: raw, normalized and aggregated

Support for kernel bypass NICs such as Solarflare, Exanic, Mellanox and Myricom. Direct integration with Solarflare EFVI for enhanced performance



MayStreet Makes it Easy

Simplify your data

Unlock value

Content

Enhancements

Innovation

Data Sourcing

- Over 225 feeds already provisioned in Market Data Lake
- Leverages Bellport Feed Handler for capture. For onprem solutions,
- Meets required quality standards - lossless, nanosecond timestamps,

Data Processing

- Developers maintain feed handlers in accordance with exchange specs
- Data normalized across all data feeds offered
- Multiple formats (PCAP, Normalized, Parquet) to meet data analysis needs
- Firms can bring their queries to MayStreet or take all the data post-processing

Data Analysis

- Analytic Workbench provides a window into Market Data Lake with built-in Python libraries and book-building capabilities
- Pre-built analytics in Workbench
- For data science use cases using industry-standard tools, MayStreet supports Parquet file formats.
- Access to pre-built analytics like TWAP and VWAP are available via API. On-demand access to the state of the book at any period of time

Decision-Making

- MayStreet QAs its data not just for completeness but also for accuracy within expected parameters
- MayStreet supplies data to regulators and understands compliance use cases
- MayStreet customers can shift their focus from data processing to value-add activities associated with the analysis and monetization of data



Thank you



