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Orchestra in Action

Building applications with machine-readable specifications

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Orchestra in Action–Building applications with machine-readable specifications

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Introduction to Atomic Wire

- A FinTech based in London and Berlin, we joined the FIX Trading Community in 2023 and are actively involved in the Orchestra subcommittee, contributing to FIX open-source projects.
- We developed community tools for Orchestra because they proved valuable for working with the modern data stack:
  - **Orchestra Build Tools** (with examples on GitHub)
  - **Orchestra Hub** (Alpha)
  - **Orchimate** (1.0)

Simple streaming query

“How many agency orders were executed in the past 1 hour?”

Answering even a simple question like this involves a lot of heavy lifting

- Diverse encodings
- User customization
- Ambiguity
- Versioning & compatibility
- Interoperability
- Ecosystem

Orchestra offers features that let us address these challenges

- Encoding abstraction
- Semantic inheritance (custom specifications)
- Message variants (scenarios)
- Append-only versioning (pedigree)
- Multi-protocol capability

INFO

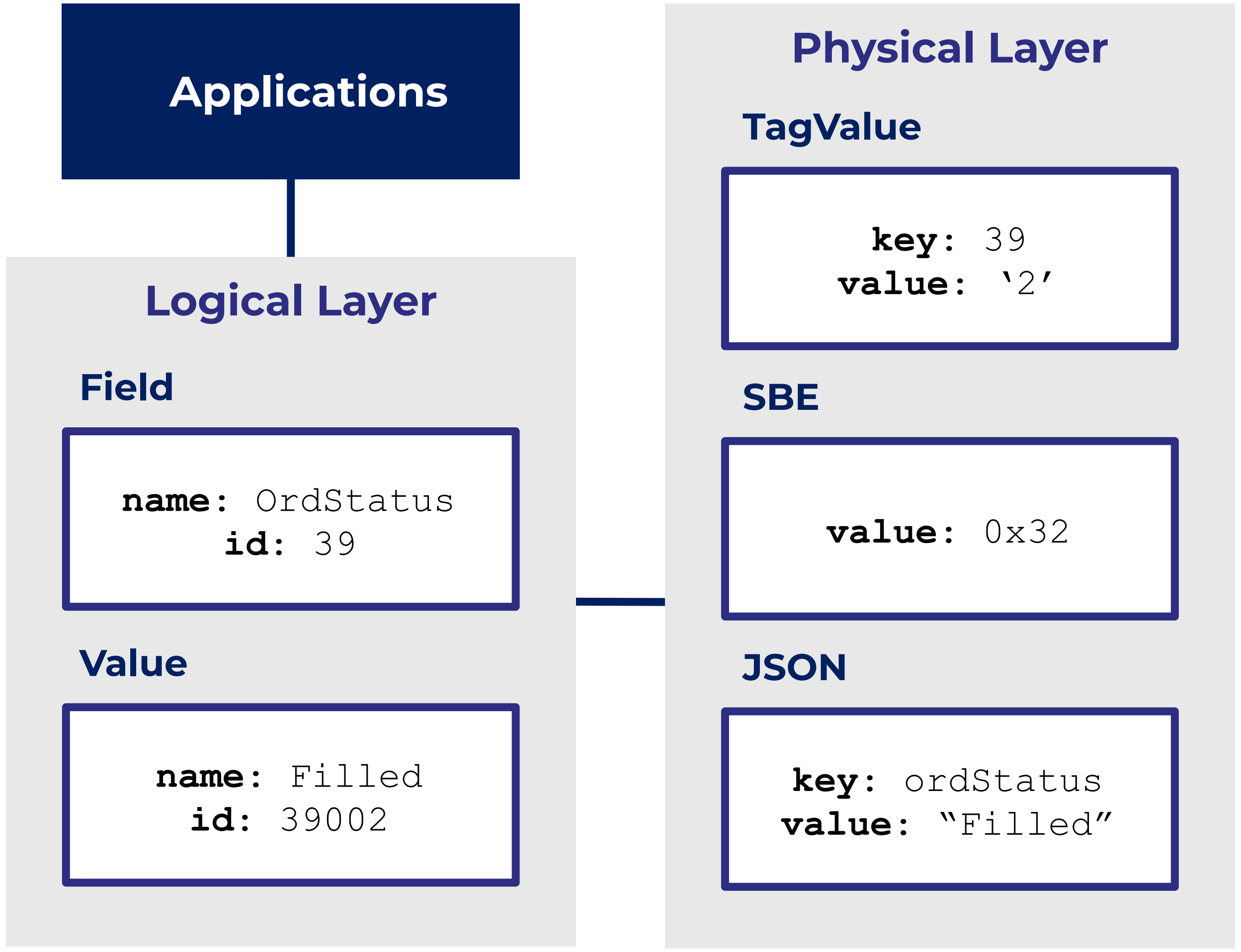
Orchestra is more than just an interface definition language—it provides a framework for building **encoding-agnostic applications** and **evolving data** in a controlled manner.

Encoding abstraction separates the underlying data encoding formats from the application logic

- Data dictionary elements are defined **independently** from over-the-wire formats.
- Each element has a logical `name` and `id` **mapped** to physical encodings.

TIP

Now we can build **generic applications** that support any encoding



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Semantic inheritance allows the creation of custom specifications while maintaining consistency

- All data dictionary elements are **uniquely identifiable**.
- Reference specifications, such as FIX, offer a global data dictionary for a specific namespace.
- Users can create **custom specifications** that inherit elements from reference specifications.
- This provides a formal mechanism for ensuring **semantic equivalence** across specifications, reducing duplication, and maintaining consistency.

Message variants remove ambiguity and allow us to tailor specifications for specific use cases

- FIX messages can serve multiple purposes
  - e.g. ExecutionReport has at least seven uses
- A variant is a **restricted version** of a global message definition, tailored for specific use cases.
- Implemented in Orchestra as **scenarios**, which are applicable to any type of data dictionary element
  - e.g. Instrument component per asset class
- Eliminates ambiguity and can reduce complexity in the application layer.

Append-only versioning lets us track, evolve, and maintain data compatibility

- Maintain **version history** in a single specification
- Add, update, or deprecate data elements without deleting or reassigning unique `name` or `id`.
- Enables **data compatibility checking**
- Simplifies upgrades and lets you **evolve data** in a controlled manner

Multi-protocol capability provides a consistent approach and enhances interoperability

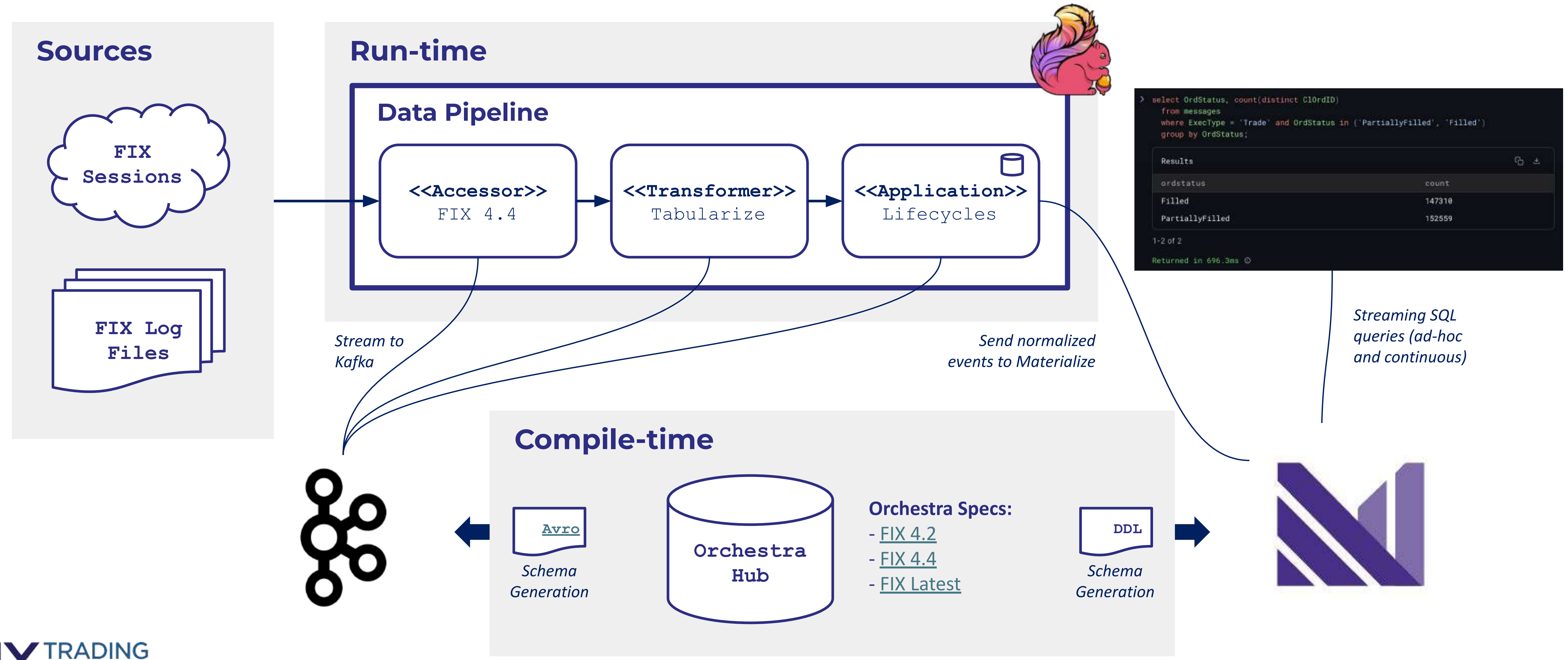
- Orchestra is **not restricted to FIX**; it offers a flexible approach for any data protocol, for instance:
  - Standard FIX and FIX customizations
  - Native market data feeds (binary)
  - FINRA CAT reporting (JSON)
- **ISO 20022** base specification is in development
- Internal **proprietary** formats can also be supported
- Provides a **generalizable** approach for any data dictionary-based protocol

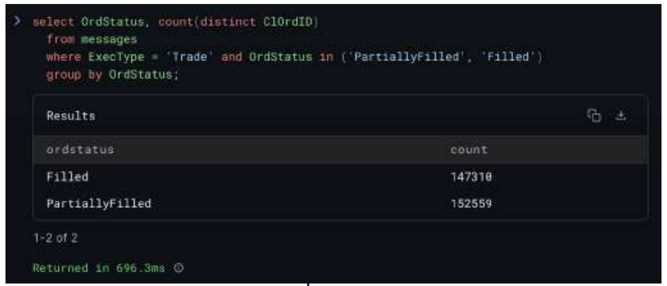
An ecosystem of community tools to build, discover and explore Orchestra specifications

- Orchestra Build Tools
  - Integrate Orchestra into your CI/CD workflows
  - Uses FIX open source CLIs where possible
  - Generate build artefacts (docs, encoding schemas, code)
  - Lots of executable examples available on GitHub
- Orchestra Hub
  - Central repository for discovering specs
  - Access specs programmatically (simplify upgrades)
  - Supports versioning
- Orchimate
  - Search and explore Orchestra specs
  - Dynamically load your own specs

Example #1: FIX SQL

Real-time and historical SQL queries over FIX data streams





```
> select OrdStatus, count(distinct ClOrdID)
    from messages
    where ExecType = 'Trade' and OrdStatus in ('PartiallyFilled', 'Filled')
    group by OrdStatus;

  Results

  ordstatus                        count
  Filled                           147310
  PartiallyFilled                  152559

  1-2 of 2

  Returned in 696.3ms
```

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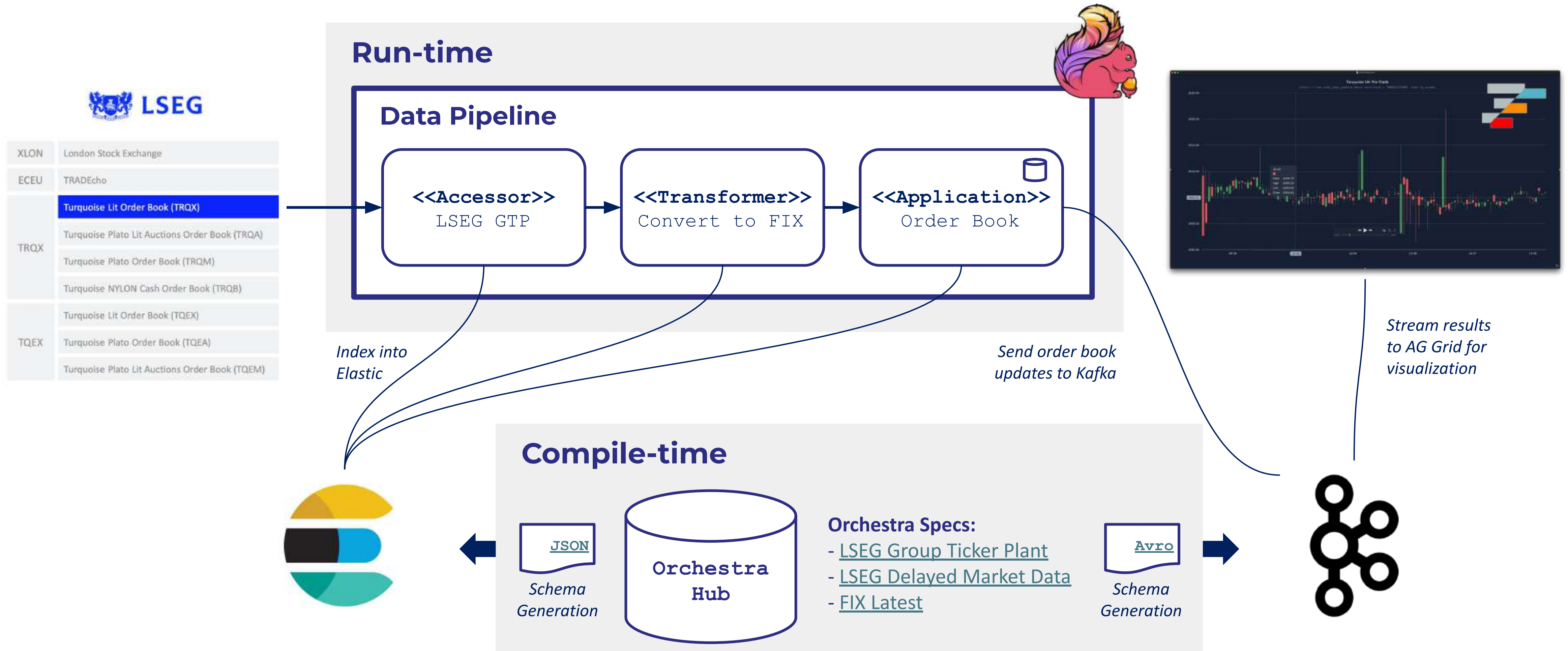
Example #2: Order Book Updates

Real-time order book state computation with LSEG market data



XLON	London Stock Exchange
ECEU	TRADEcho
TRQX	Turquoise Lit Order Book (TRQX)
	Turquoise Plato Lit Auctions Order Book (TRQA)
	Turquoise Plato Order Book (TRQM)
	Turquoise NYLON Cash Order Book (TRQB)
TQEX	Turquoise Lit Order Book (TQEX)
	Turquoise Plato Order Book (TQEA)
	Turquoise Plato Lit Auctions Order Book (TQEM)

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Q&A

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