EMSX API

Machine Learning & Trade Automation

Monday, March 5, 2018

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AGENDA

1)
INTEGRATION

2)
THE DESIGN

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3)

RELEASE CREATIVITY – MODEL & TRADING
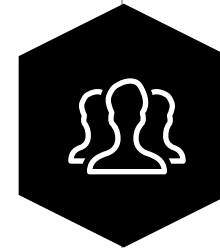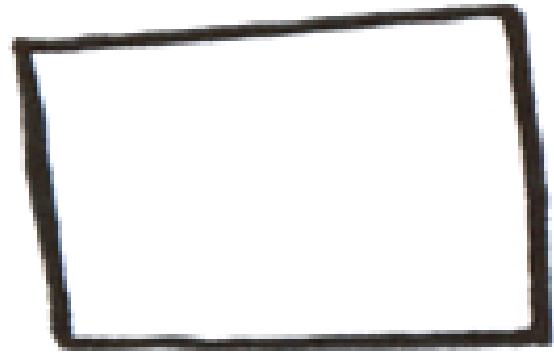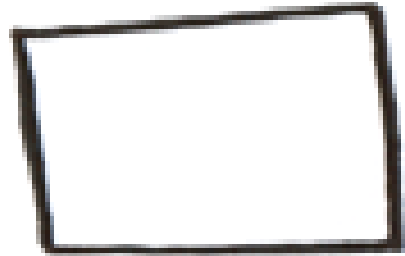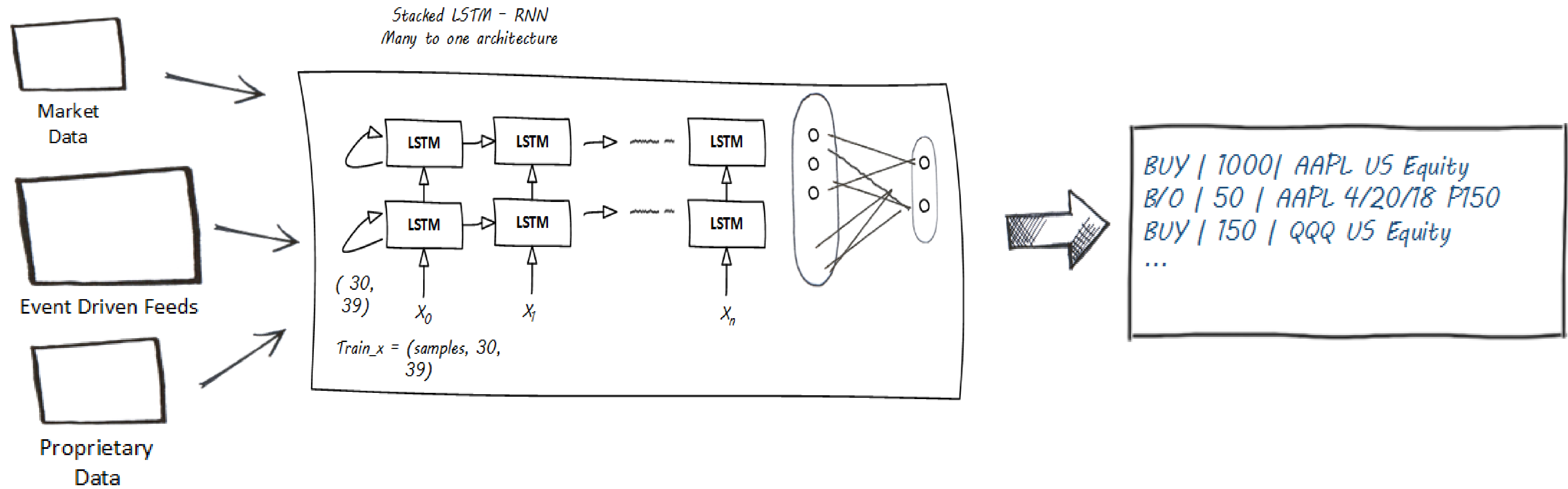
4)

REFINE

FINISH
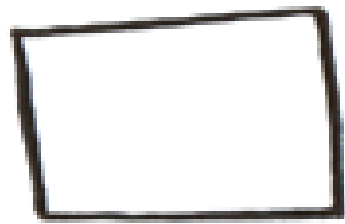
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WORKFLOW

Market
Data

Event Driven Feeds

Proprietary
Data

DATA

Gather data: Market Data, Event-Driven

Feed, Proprietary Data set

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Stacked LSTM - RNN
Many to one architecture

Market Data

Event Driven Feeds

Proprietary Data

(30, 39)

X_0 X_1 X_n

Train_x = (samples, 30, 39)

BUY | 1000| AAPL US Equity
B/O | 50 | AAPL 4/20/18 P150
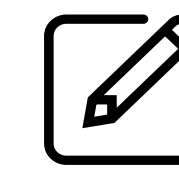BUY | 150 | QQQ US Equity
...

DATA

Gather data: Market Data, Event-Driven Feed, Proprietary Data set

BUILD / TRAIN MODEL

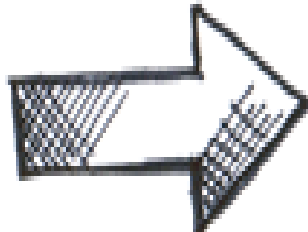Build and start training model

TRADES CREATED

Generate trades based on input data

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BUY | 1000 | AAPL US Equity
B/O | 50 | AAPL 4/20/18 P150
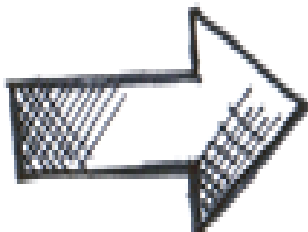BUY | 150 | QQQ US Equity
...

EMSX API

CreateOrderAndRouteEx

...
EMSX_TICKER: AAPL US Equity
EMSX_AMOUNT: 1000
EMSX_BROKER: ABCD
EMSX_STRATEGY_NAME: VWAP
...

1800+ broker destinations
3000+ broker codes

Java
C# .NET
C++
C
...

Python 3

TRADES

Trades for Equities, Futures and Options
using Python, Java, C# / .NET, C++, and C

EXECUTION STRATEGY

Single vs. Basket, Prop Algo vs. Broker
Algo, TCA, Timing of Execution and etc.

GLOBAL EXECUTION VENUES

1800+ Destinations for execution and
liquidity within 3000+ broker codes.

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REQUEST/RESPONSE

CONTROL

27 Request/Response Operators to control

Operations:
- AssignTrader
- CancelOrderEx
- CancelRouteEx
- CreateOrder
- CreateOrderAndRouteEx
- GetBroker
- GetBrokerStrategiesWithAssetClass
- GetTeam
- GetTraders
- GroupRouteEx
- ManualFill
- ModifyOrderEx
- ModifyRouteEx
- RouteEx
- RouteManuallyEx
- SellSideAck
- SellSideReject
- ...

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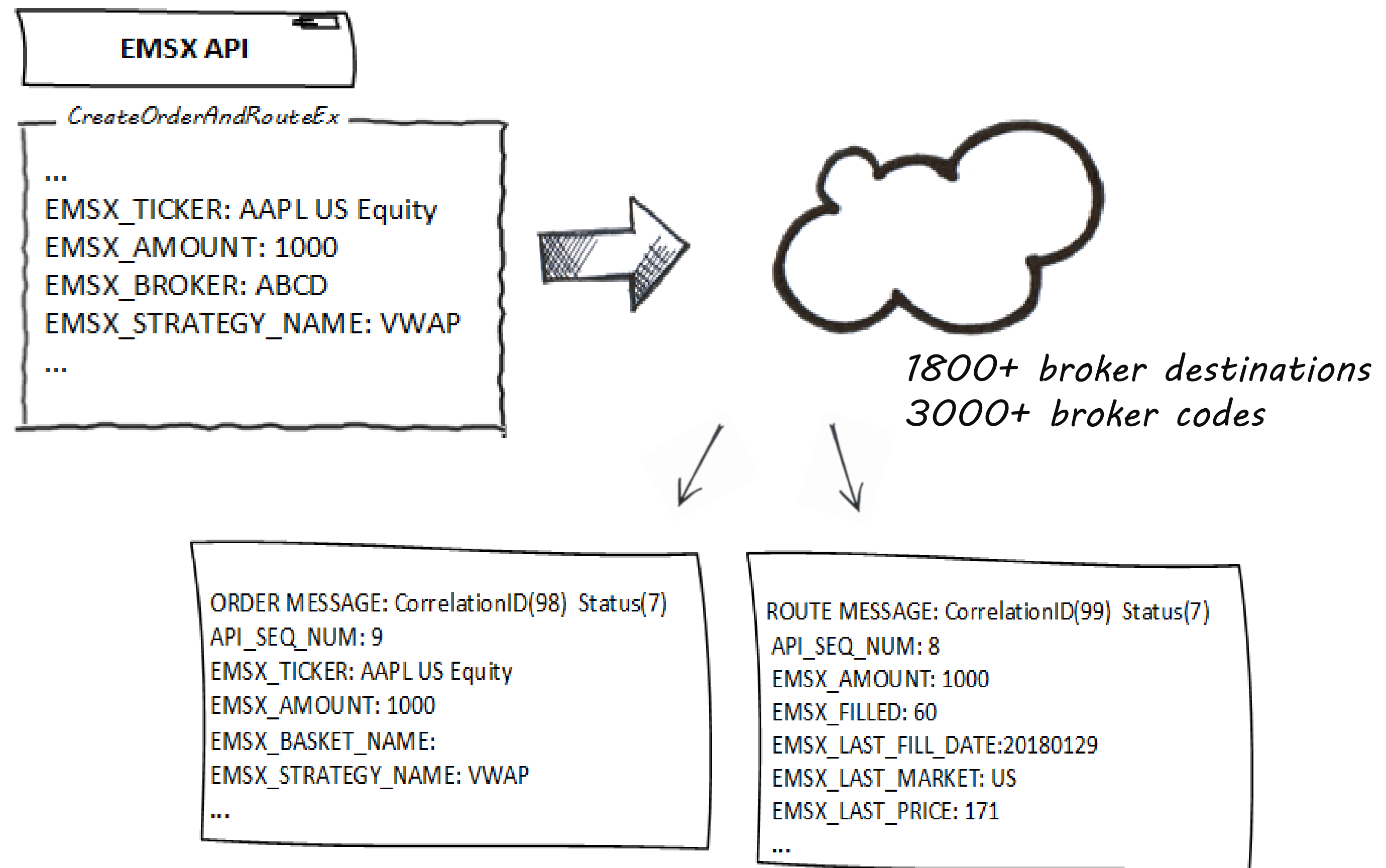# SUBSCRIPTION

ORDER & ROUTE

156 Elements to Subscribe
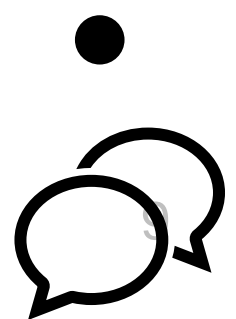
Events:
- API_SEQ_NUM (INT64)
- EMSX_ACCOUNT (STRING)
- EMSX_AMOUNT (INT32)
- EMSX_APA_MIC (STRING)
- EMSX_ARRIVAL_PRICE (FLOAT64)
- EMSX_ASSET_CLASS (STRING)
- EMSX_ASSIGNED_TRADER (STRING)
- EMSX_AVG_PRICE (FLOAT64)
- EMSX_BASKET_NAME (STRING)
- EMSX_BASKET_NUM (INT32)
- EMSX_BLOCK_ID (STRING)
- EMSX_BROKER (STRING)
- EMSX_BROKER_COMM (FLOAT64)
- EMSX_BROKER_LEI (STRING)
- EMSX_BROKER_SI (STRING)
- EMSX_BROKER_STATUS (STRING)
- EMSX_BUYSIDE_LEI (STRING)
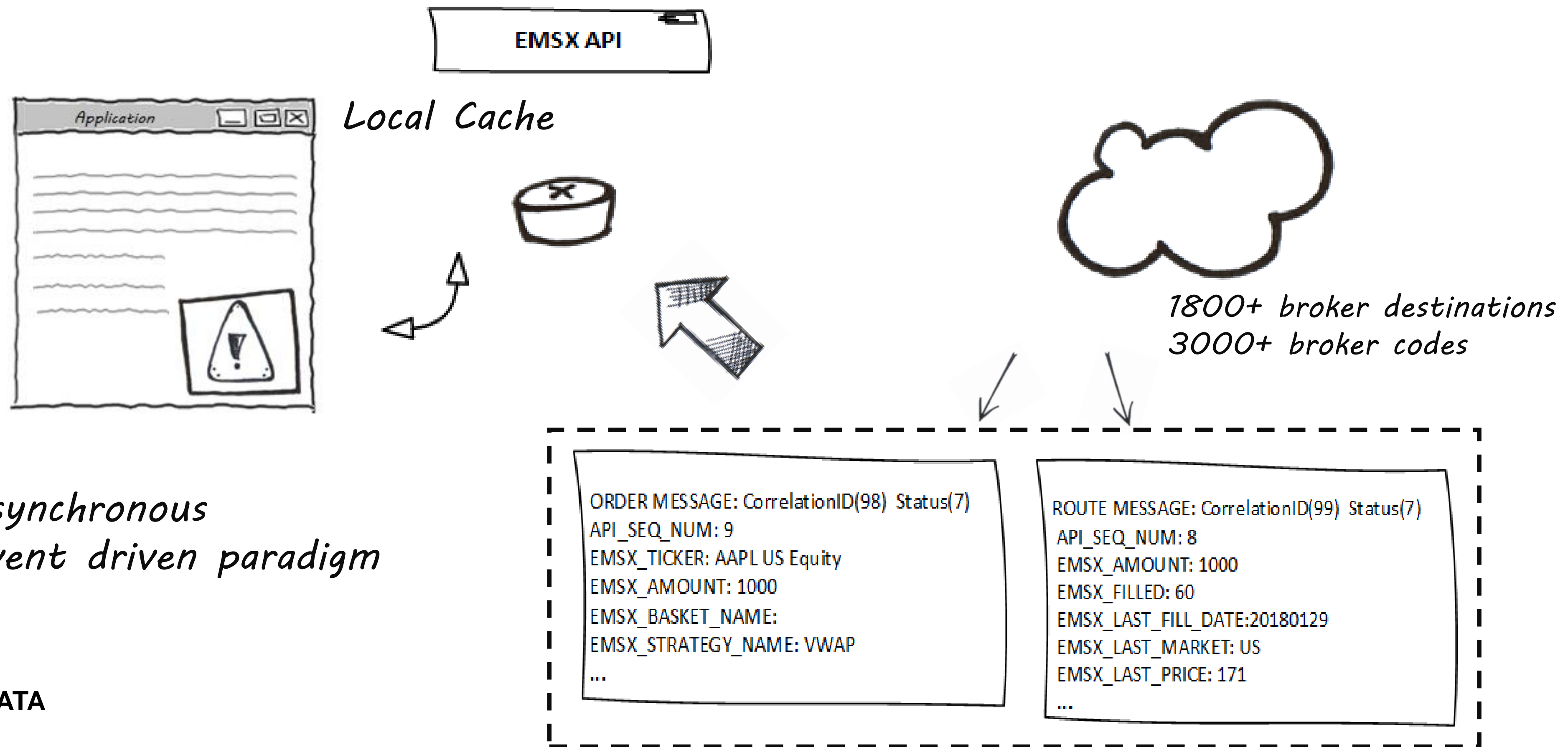- EMSX_CFD_FLAG (STRING)
- EMSX_CLEARING_ACCOUNT (STRING)
- ...

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EMSX API

CreateOrderAndRouteEx

...
EMSX_TICKER: AAPL US Equity
EMSX_AMOUNT: 1000
EMSX_BROKER: ABCD
EMSX_STRATEGY_NAME: VWAP
...

1800+ broker destinations
3000+ broker codes

ORDER MESSAGE: CorrelationID(98) Status(7)
API_SEQ_NUM: 9
EMSX_TICKER: AAPL US Equity
EMSX_AMOUNT: 1000
EMSX_BASKET_NAME:
EMSX_STRATEGY_NAME: VWAP
...

ROUTE MESSAGE: CorrelationID(99) Status(7)
API_SEQ_NUM: 8
EMSX_AMOUNT: 1000
EMSX_FILLED: 60
EMSX_LAST_FILL_DATE:20180129
EMSX_LAST_MARKET: US
EMSX_LAST_PRICE: 171
...

TRADING DATA

Real-Time & Ad-hoc request for fills history

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EMSX API

Local Cache

1800+ broker destinations
3000+ broker codes

- Asynchronous
- Event driven paradigm

ORDER MESSAGE: CorrelationID(98) Status(7)
API_SEQ_NUM: 9
EMSX_TICKER: AAPL US Equity
EMSX_AMOUNT: 1000
EMSX_BASKET_NAME:
EMSX_STRATEGY_NAME: VWAP
...

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TRADING DATA

Real-Time & Ad-hoc request for fills history
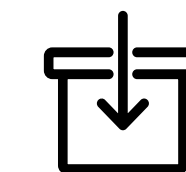
LOCAL CACHE

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CUSTOM APP

Visualize the data
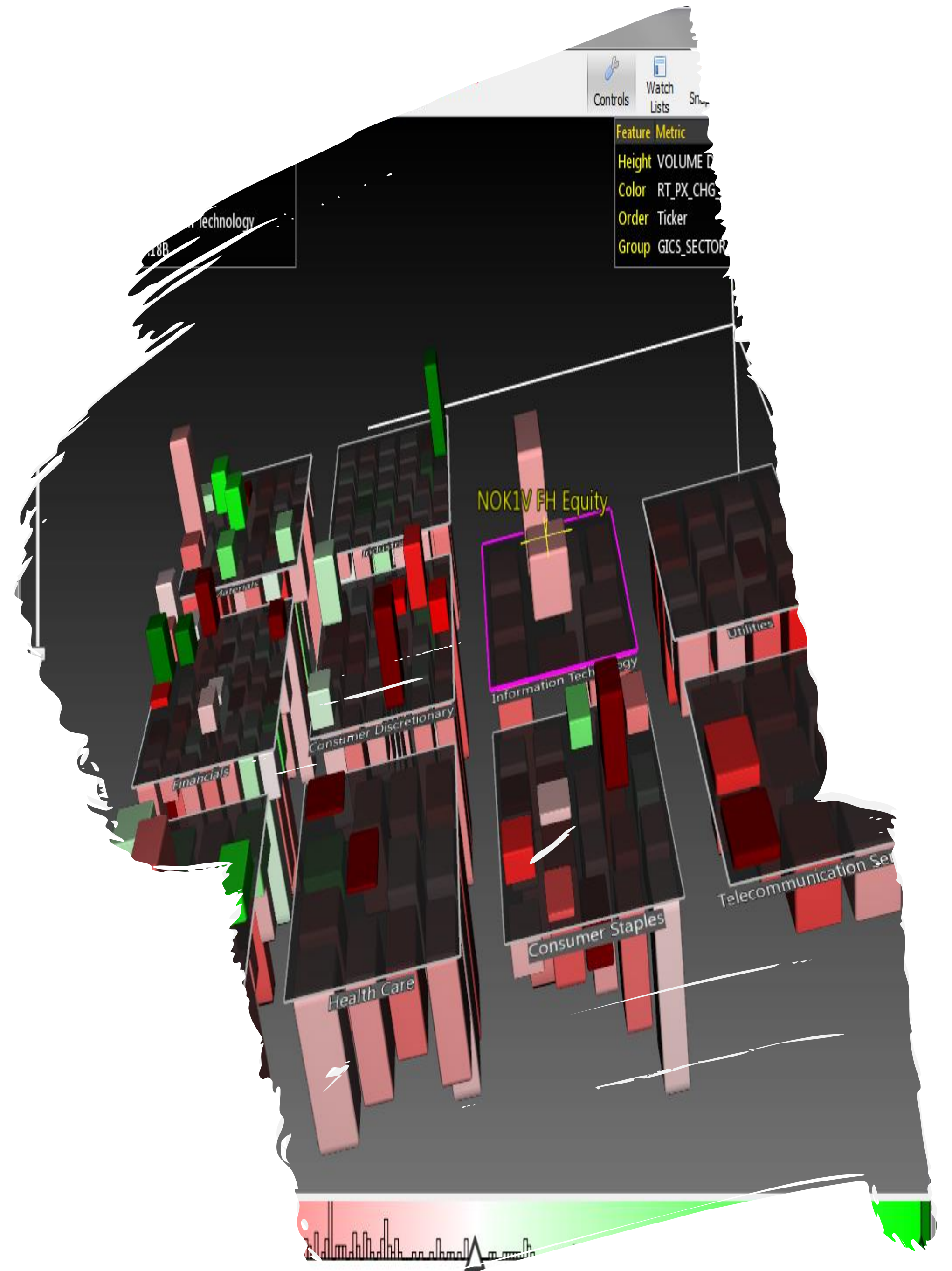
Custom Analytics API

EMSX API

IOI API

Local Cache
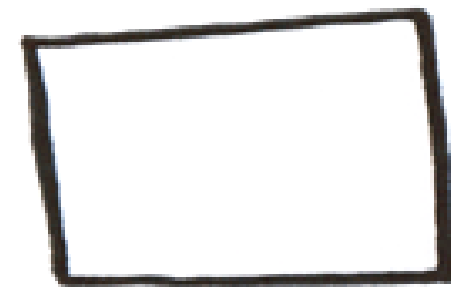
Event Driven Feeds
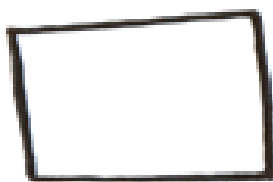
Market Data

Proprietary Data

Stacked LSTM – RNN
Many to one architecture

Train_x = (samples, 30, 39)

$(30, 39)$ X_0 X_1 X_n

PROP DATA
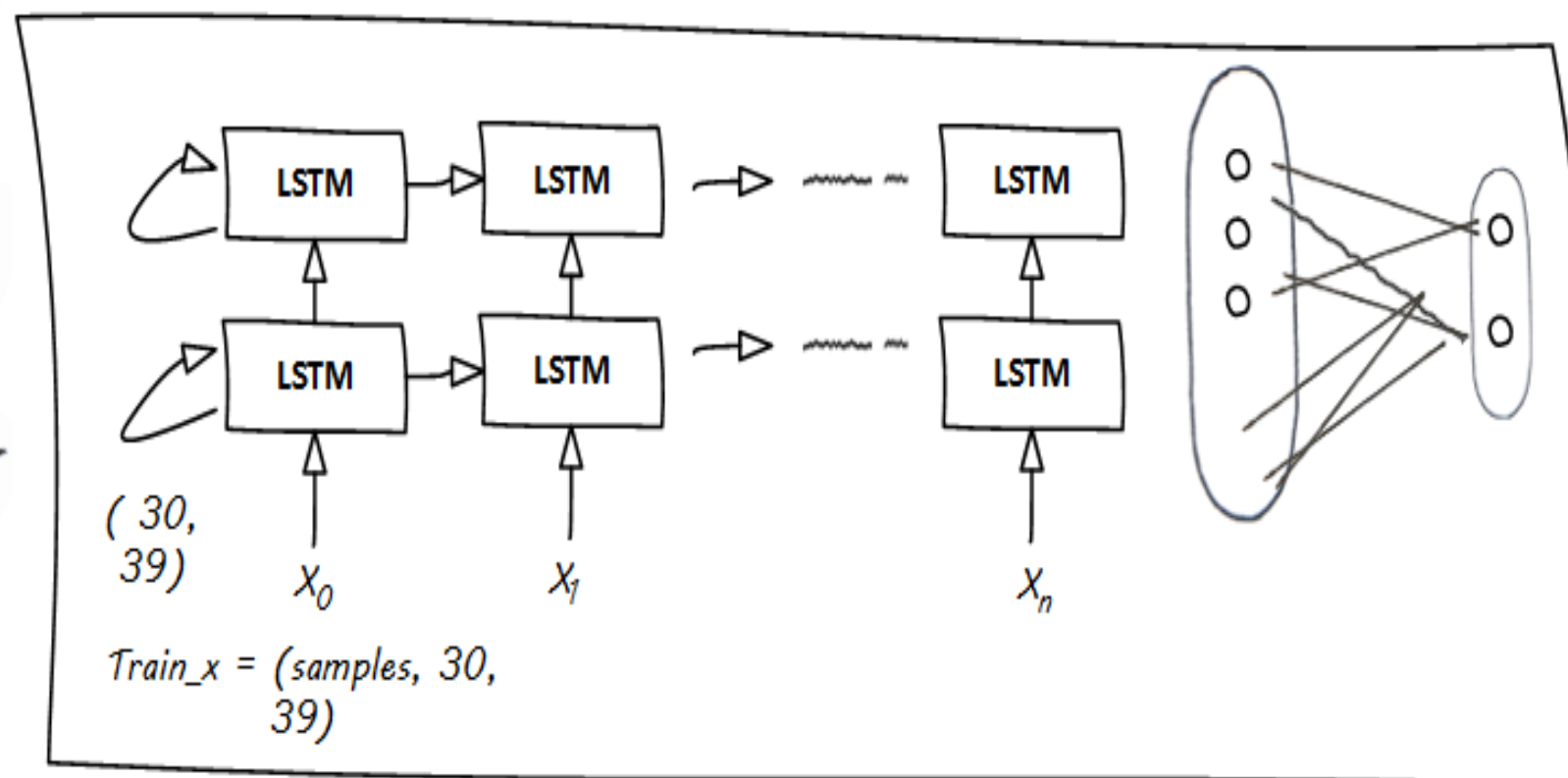
FEED TO THE MODEL
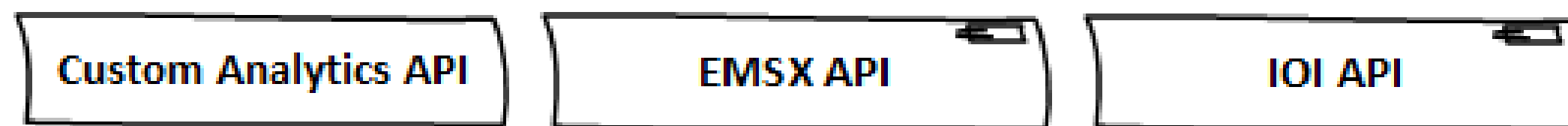
Another data feed to the model to manage execution strategies and TCA
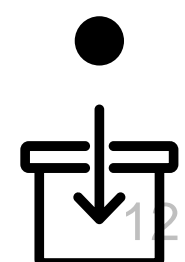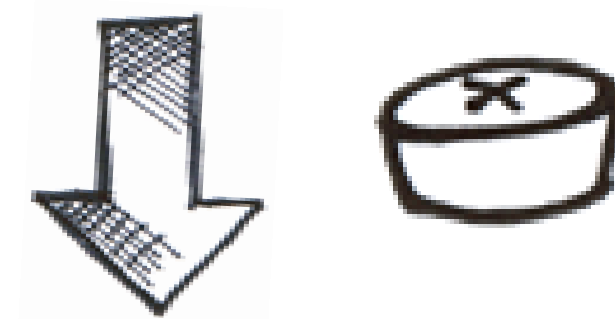
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DEFINE WORKFLOW AUTOMATION

AUTOMATION 1

 - Listen to various data feed (e.g. market data) and release the trades to the market based on price, volume, events and etc.

AUTOMATION 2:

- Stage the orders to EMSX<GO>

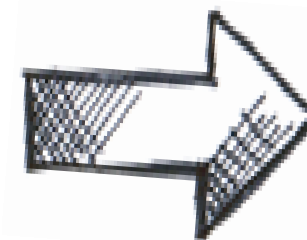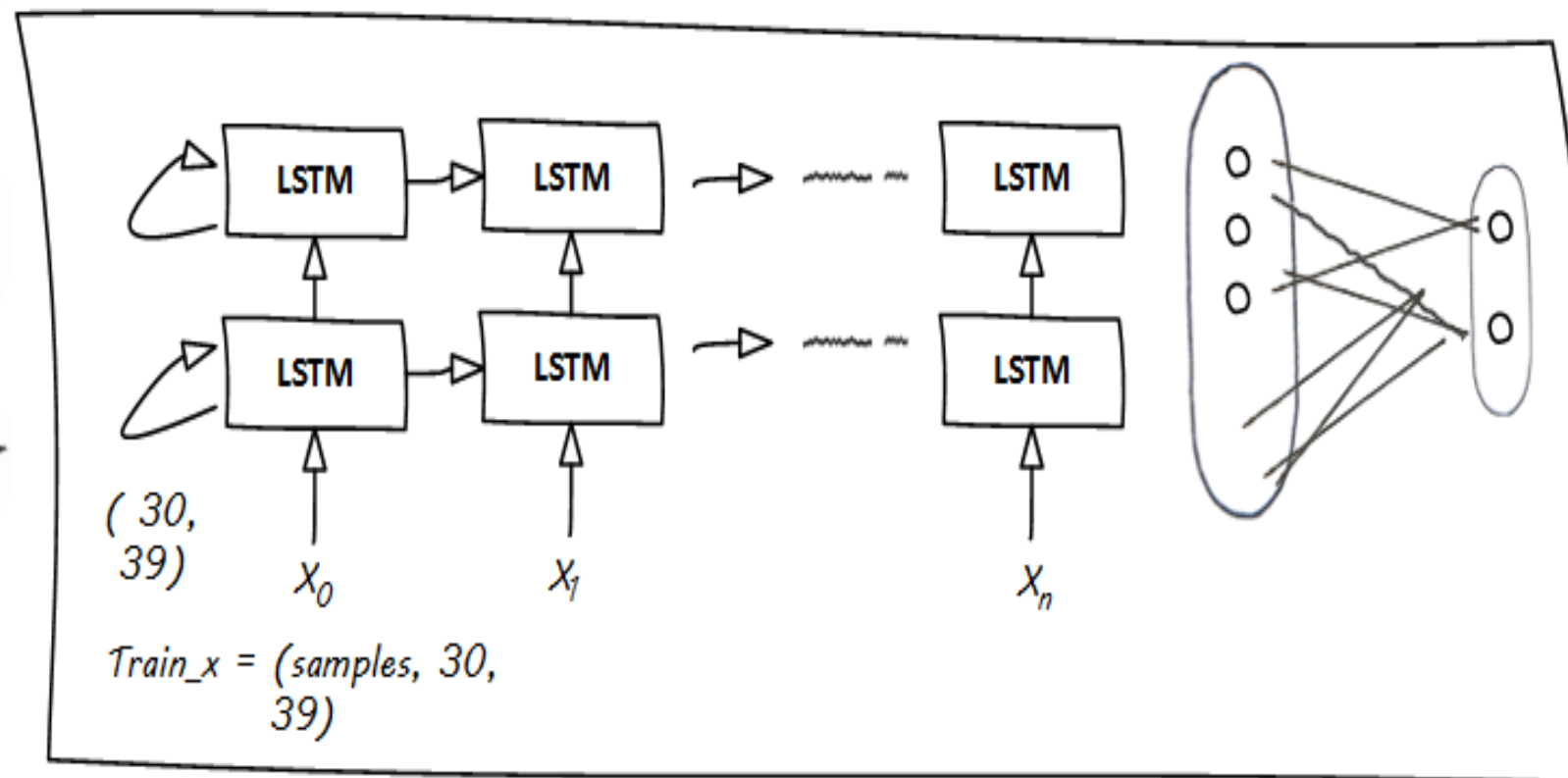- Wait for events to release the orders and hedges based on prebuilt rules (rete algorithm)

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Custom Analytics API

EMSX API

IOI API

Local Cache

Stacked LSTM – RNN
Many to one architecture

$(30, 39)$

LSTM → LSTM → ～～ ～ → LSTM
LSTM → LSTM → ～～ ～ → LSTM

X_0 X_1 X_n

Train_x = (samples, 30, 39)

Event Driven Feeds

Market Data

Proprietary Data

FEED TO THE MODEL

Another data feed to the model to manage execution strategies and TCA

MODEL:

Idea Generation

Portfolio / Order Management:
-Signal Generation/Management
-Continuous Training

Trade Execution Management:
-Best Execution Venue
-Best Liquidity Source
-Best Execution Algorithms
-Best Execution Timing

-Transaction Cost Management
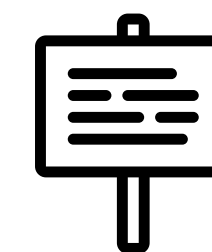
FINISH
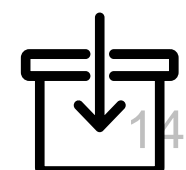
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Global Statistics

Trading
56%

Integration
44%

- Trade from EMSX<GO>
- Gray box trading
- Man & Machine

Black Box
10%

- Trade from EMSX<GO>
- Subscribe real-time/ad-hoc data
- Integration with Trading Information

- Complete Trade Automation

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DISCLAIMER

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THE END

Machine Learning & Trade Automation