Data Source Layer

Phase

Fonction

This is a data staging area where data from various external sources is received and data is sent for preprocessing in the data preprocessing layer. Components on this layer manage the performance of the network connections from external data sources

Technical proposal

1. **Data Source Provider :** swigibpy - Third party Interactive Brokers Python API generated from TWS C++ API using SWIG.
   Google Finance API – IQFEED API Third party provider
2. **Data Storing :** Hadoop HDFS

Data Pre-Processing Layer

Phase

Fonction

In this layer data is received by the data source layer and prepared for analysis.
1. **Data Ingestion/Data filtering** filters out irrelevant data.
2. **Data extraction, transformation, and loading (ETL)** extracts filtered data, transforms it into a standard format or schema, and loads that data into the end target.
3. **Operational Data Store (ODS)** stores relevant data and uses predefined Business rules to ensure the integrity of that data. This data is then analyzed using a continuous querying languages (CQL) which is implemented as a stream. CQL is used in complex event processing to identify long term and complex events (CE).

Technical proposal

1. **Data Ingestion/Data filtering** : Kylo Data Lake / FLUME (Hadoop Ecosystem)
2. **Data extraction, transformation, and loading (ETL) :** Kylo Data Lake / HIVE - PIG (Hadoop Ecosystem)
3. **Operational Data Store (ODS) :** Pipelinedb DataBase For Continous quering based on PostgreSQL DataBase / HBASE (Hadoop Ecosystem)

Intelligence Layer

Phase

Fonction

This is where the actual algorithmic trading happens.
1. **Complex event processing (CEP) / Event queue :** engine allows multiple event driven trading strategies and ML models to be defined, to communicate and To be executed.
2. **Machine learning prediction model (ML) :** The main intelligence of the trading system
- Forcasting stocks price models,
-Alpha models,
- Risk management models,
- Portfolio management models
3. Stream Processing

Technical proposal

1. **Complex event processing (CEP) :** Confluent stream data platform / Kafka / Amazon Kinesis
2. **Machine learning prediction model (ML) :** Python / Sklearn / Mahout
3. Stream Processing

Order Processing Layer

Phase

Fonction

The order processing layer is responsible for receiving trading orders from the intelligence layer, Validating those orders and sending them to market exchanges, darkpools, banks, and brokerages; tracking all open positions through responses from these entities; and logging all orders made onto a data recovery and backup server.

Technical proposal

1. **Order Route :** Quickfix engine/ Interactive broker swigibpy
2. **Machine learning Risk models (ML) :** Python / Sklearn / Mahout
3. **Data Warehouse (DWH) :** Hbase / Hive - PIG / PostgreSQL DataBase