

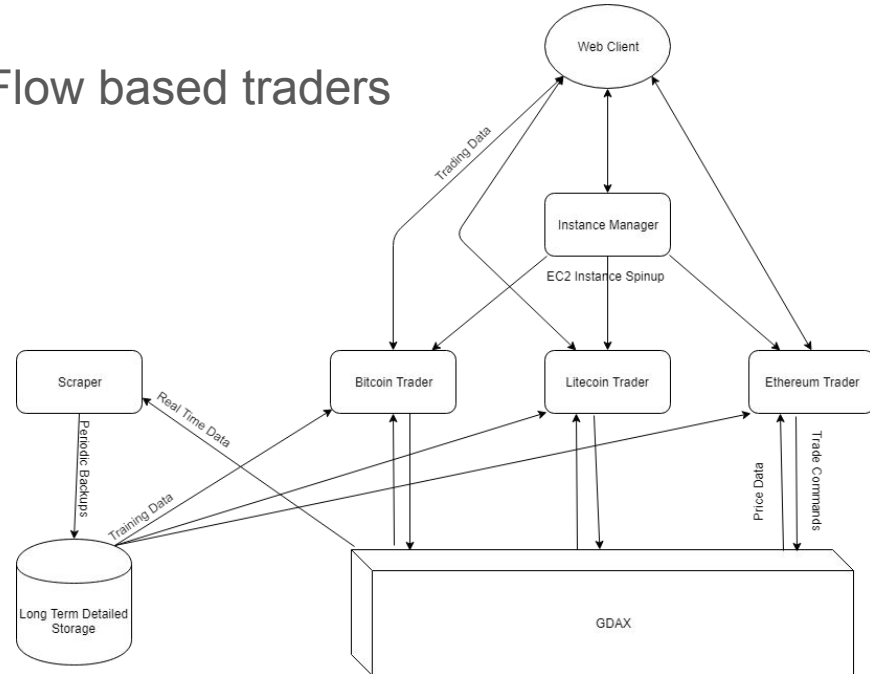
# LiteTrader v.9

An Algorithmic Cloud-Based Trading Platform

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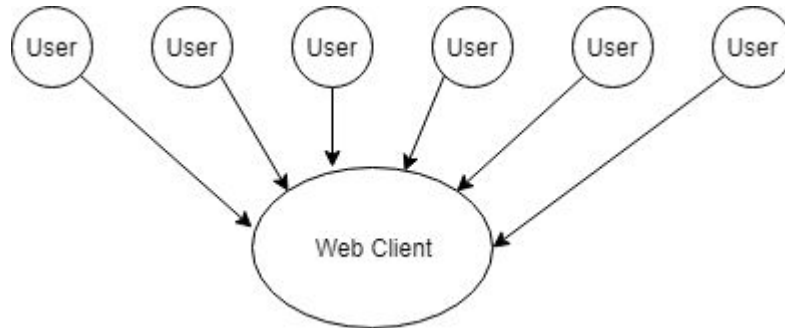
# Features

- User management system
- Request proxy
- Statistical Analysis and TensorFlow based traders
- Virtual Machine provisioning
- Fault Tolerance



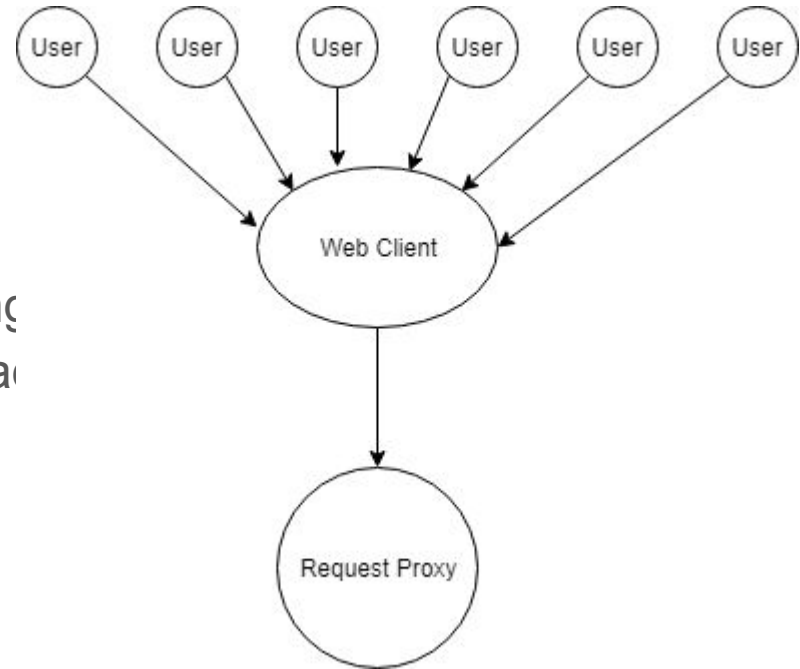
# User Management System

- Web endpoint where users connect
- Users register with a username, password, and associated AWS/GDAX keys
- Script-based password hashing, key derivation for secure storage
- Periodic user database backups to S3
- Users run traders on servers they pay for, so they can determine how powerful they can be
- Can also run data scrapers, which checkpoint to S3 as well



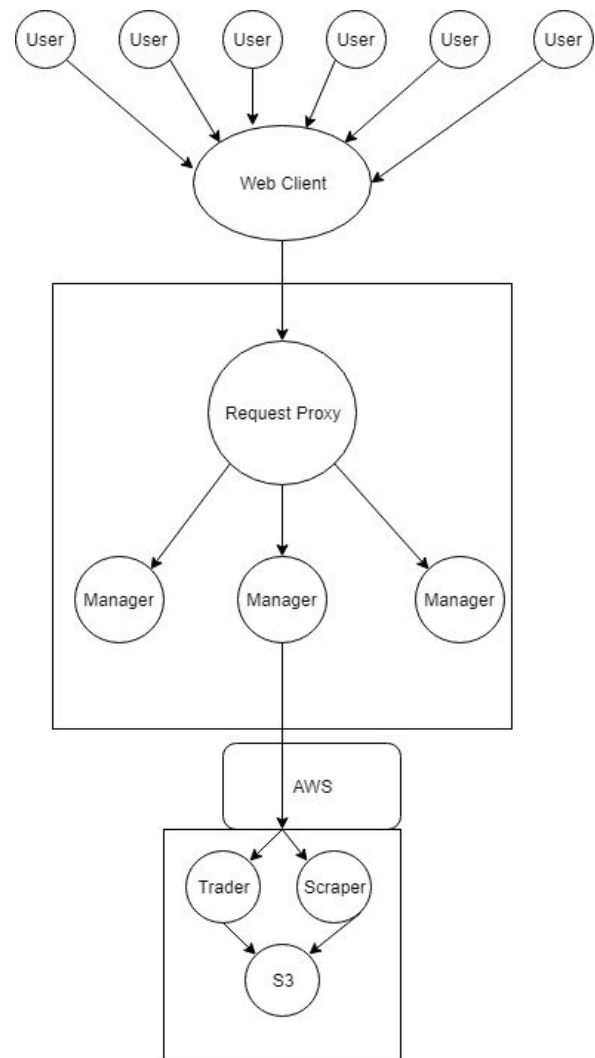
# Request Proxy

- The request proxy receives requests from the web service, which it then multiplexes to the proper manager
- I/O nature of tasks allows us to scale very nicely
- Scaling of web services is a well solved problem - we can do it if need be by running the web client and the proxy on top of a load balancer



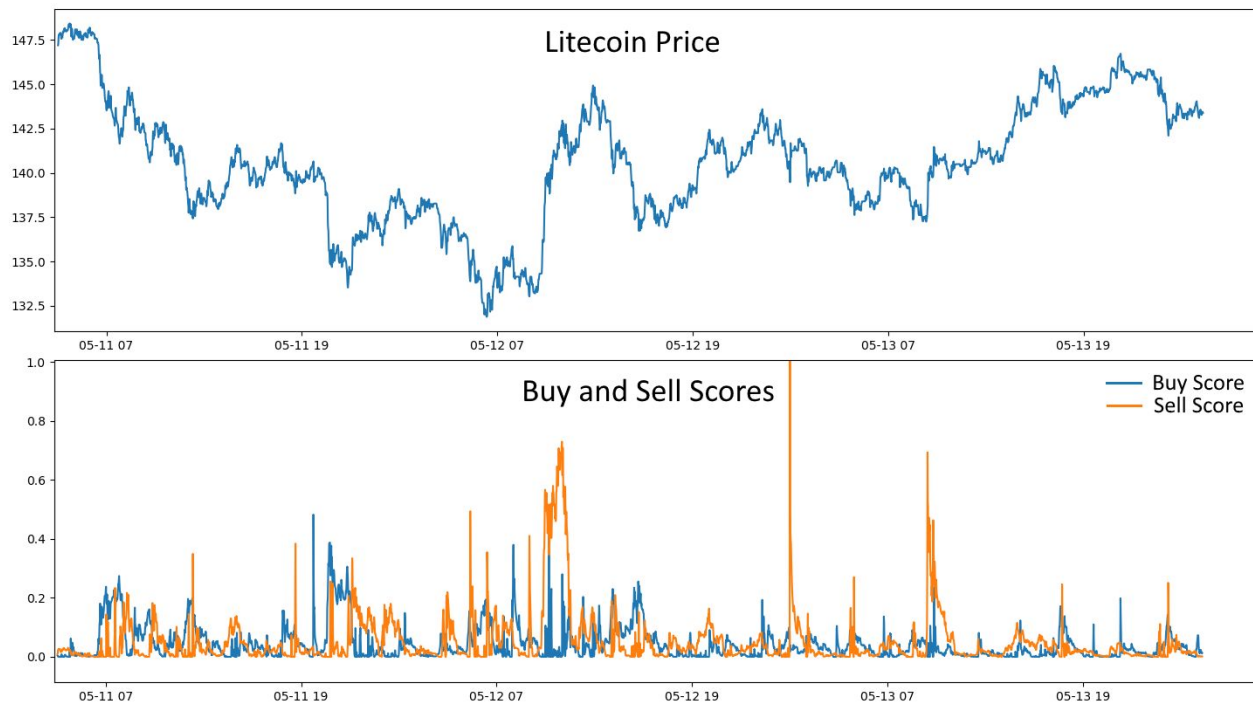
# Virtual Machine Provisioning

- Our management suite automates the process of setting up virtual machines to run various tasks, such as trading and scraping
- We do everything from create the instance, installing dependencies, moving code over, starting up services etc.
- We manage state on all machines created by users and ensure maximal uptime through health checks



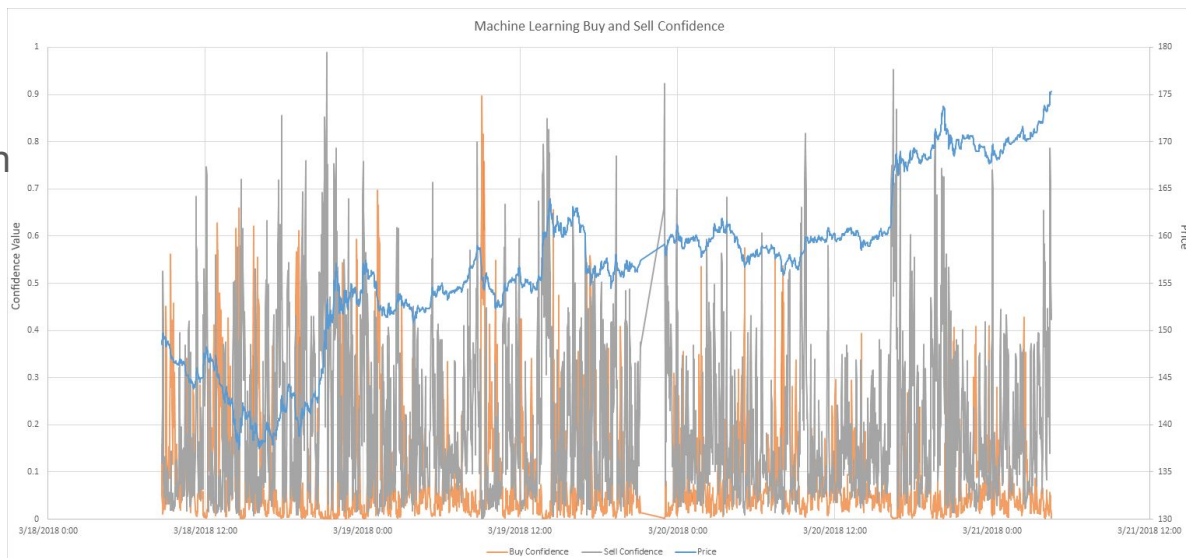
# Statistical Analysis Trading

- Generally waits for large price swings before making a buy or sell
- Calculates buy/sell scores using a linear regressions since a local max/min
- Users adjust thresholds for buying and selling based on market conditions
- Aggressively places limit orders to avoid taker fees



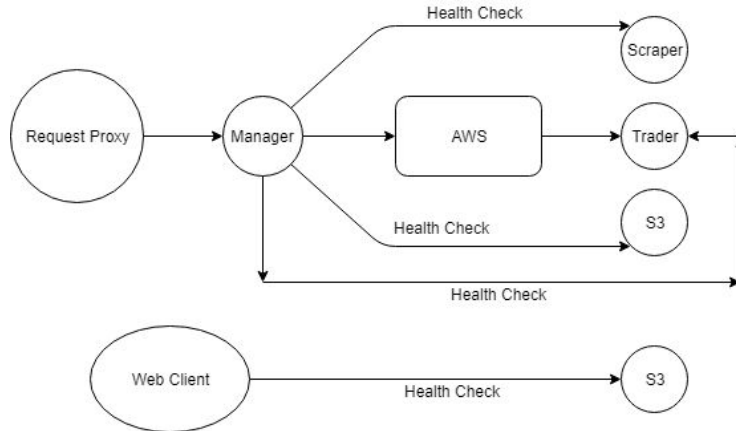
# TensorFlow Trader

- Operates as a two layer convolutional neural network
- Training data is automatically classified by finding local mins and maxes
- Pre-classified training data is pulled from S3 when a new trader is started
- Training can be configured to train against different ratios of hold points to buy and sell points
- Feature columns include:
  - price change since max/min
  - time since max and min
  - trade volume
  - change in trade volume



# Fault Tolerance

- User database checkpointed to S3, so can recover from catastrophic failures
- Both web server and request proxy have health checks - therefore can detect instance shutdown and program crashes and recover
- Automated failure recovery on VM's running traders
- We recover from both program crashes and server shutdowns





# Insights

- TensorFlow Trading is quite difficult
- Having backgrounds in investing would be helpful for developing a trading strategy
- Given that trading cryptocurrencies is a global market, automated traders help profit during our night time while eastern markets are active
- Social component is absolutely necessary for making good trade decisions

# If We Had More Time...

- Fully Automated Fault Tolerance - recover automatically from web/proxy failures
- More sophisticated logging
- More research on TensorFlow Trader
- Programmatic load testing on web/proxy
- More front end customization/styling
- Allow more configurable features from the front end
- More security features (password reset, 2-FA)