EX

5HT AUG 25 2019

TOC

1. EXCHANGE USER INTERFACE

— AUTH (Google vs PKI)
— Market Assets/Tickers
— Market Data History
— Depth of Market Oredr Book
— Order Maker
— Personal Wallet

NOTES: Usually Exchanges provide Google Auth secured own token issue machanism based on HashiCorp Vault or other key stores. While we see most powerful security based on ECC/RSA Public Key Cryptography.

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1.1. GOOGLE AUTHENTICATOR

AUTH | TIC | TRADE | FIN

Mail:

Passphrase:

2PA:

1.2. PUBLIC KEY INFRASTRUCTURE

Login/Enroll

Load Client X.509 certificate from file [Load]

[X] Create new X.509 certificate

Organizational Unit:

Common Name:

Enroll new X.509 certtificate [Enroll]

Logout/Revoke

[X] Revoke X.509 certificate at CA

Destroy certifcate at device. [Delete]

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NOTES: Usually Exchanges provide Google Auth secured own token issue machanism based on HashiCorp Vault or other key stores. While we see most powerful security based on ECC/RSA Public Key Cryptography.

1.3. MARKET

AUTH	TIC	TRADE	FIN

Filter::

Asset	Pair	Price	Volume	Chart

NOTES: List of all tickers/assets on the given exchanges (or all tokens from peer-exchanges in case of arbitrage support).

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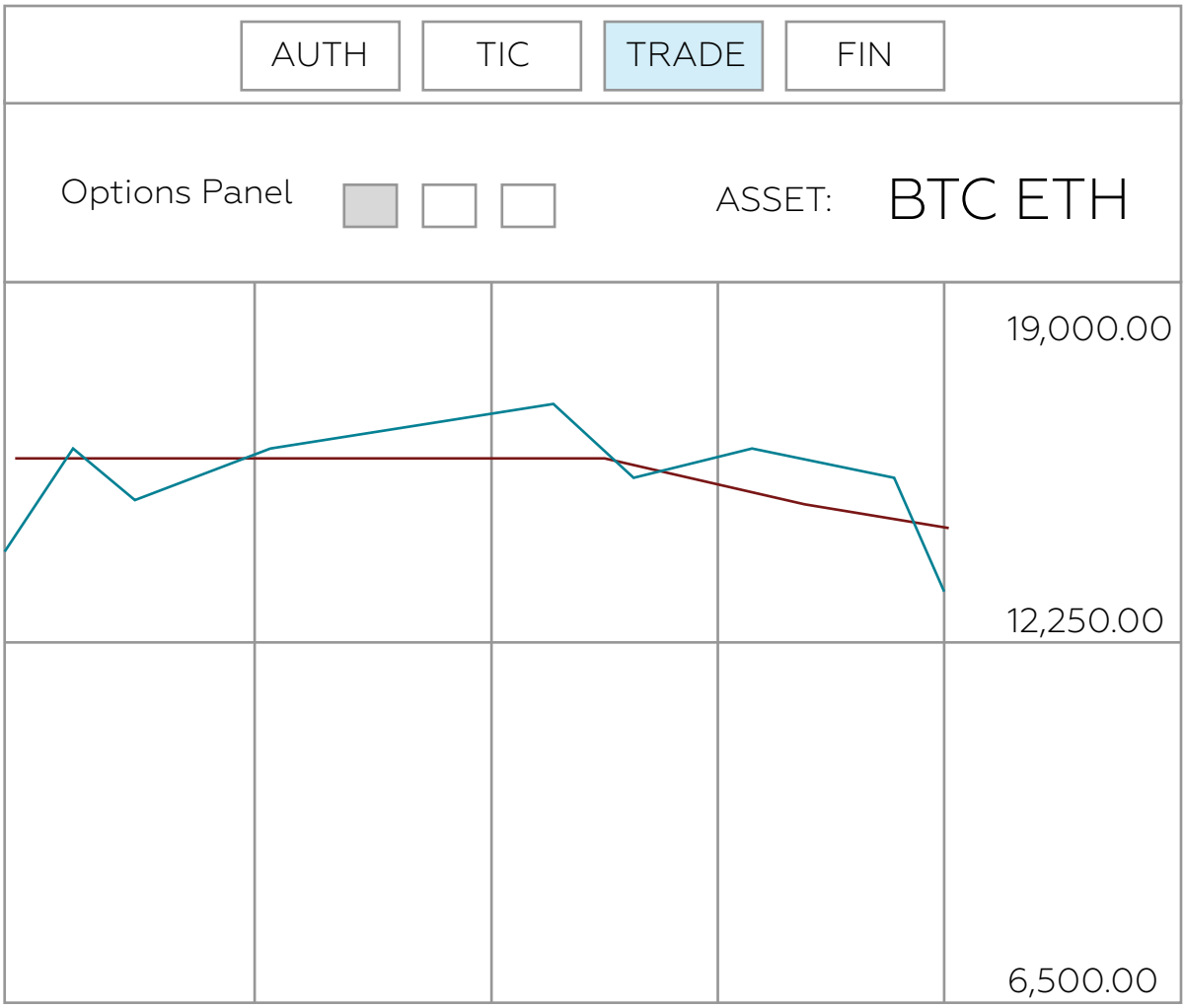
1.4. MARKET DATA HISTORY and PREDICTION



NOTES: Market Data History Contorol Element that is in conjunction with DOM and Order Placer forms the Trading Interface that in modern exchanges always placed at the same trading dashboard page.

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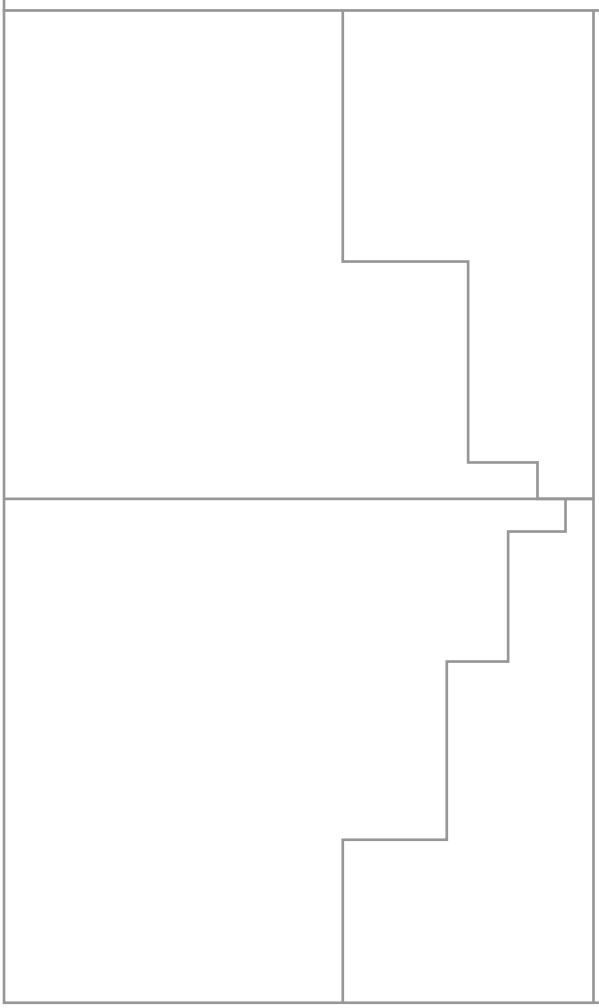
1.5. DEPTH OF MARKET for TICKER

AUTH | TIC | TRADE | FIN

MARKET PRICE: 11,525.40 ASSET: BTC ETH

Options Panel



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165 117076000000 -6443000000
163 116609000000 -3287000000
 21 116435000000  -876000000
161 115617000000  -279199700
167 115545000000  -468957492
 27 115332000000   -25000000
 28 115331000000    -3000000
 62 115284000000  -301020000
109 115283000000   -28000000
 66 115254000000     1000000
 64 115253000000    29800000
149 114950000000    99000000
133 114936000000    98000000
130 114928000000    99000000
127 114920000000    97000000
126 114914000000    92000000
124 114903000000   103000000
123 114891000000    98000000
122 114884000000   108000000
  1 114871000000  1700000000
121 114865000000   100000000
104 114854000000   265779000
 33 114792000000    25000000
164 114791000000   449969320
 53 114774000000   316000000
 70 114753000000   195000000
119    001000000  8973000000

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                Total: 393844763
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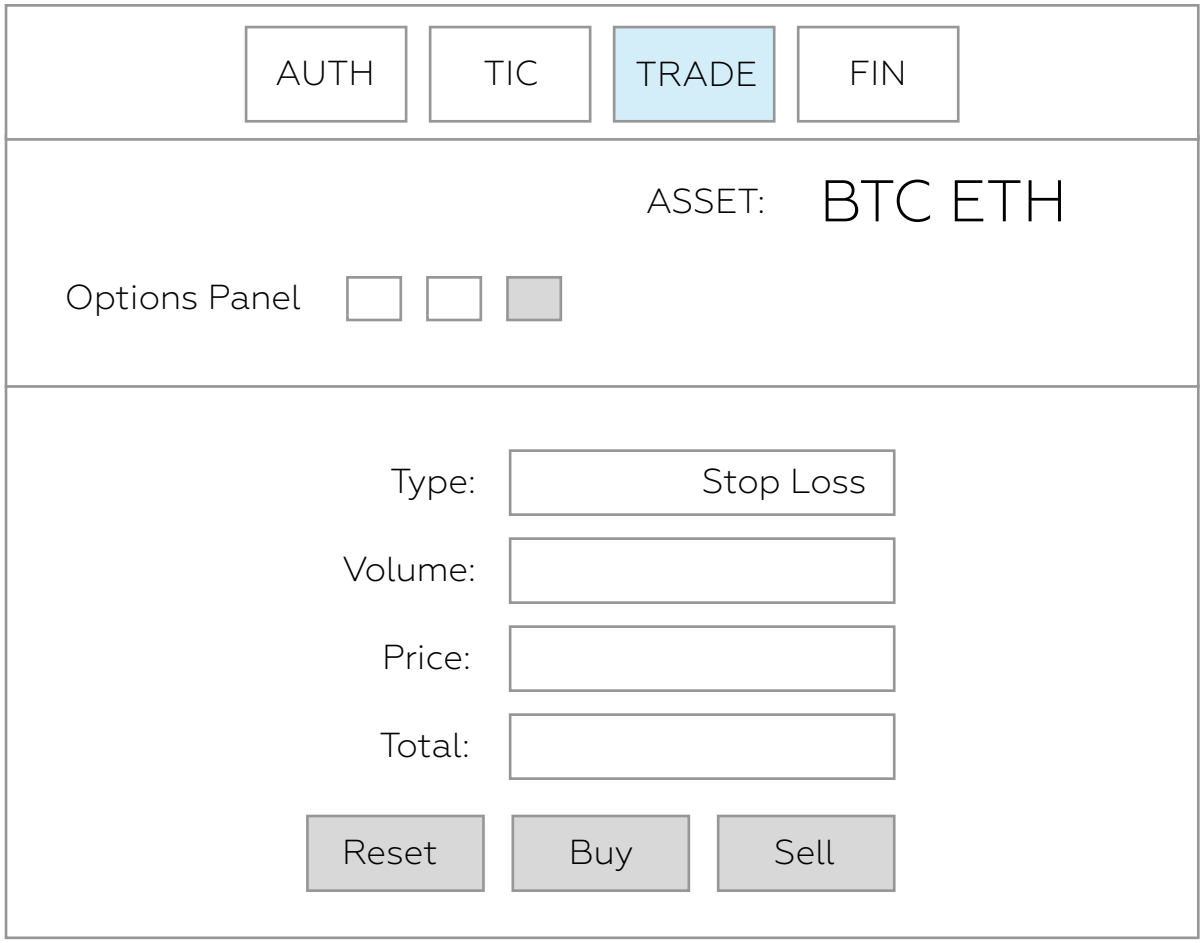
1.6. MAKE ORDER



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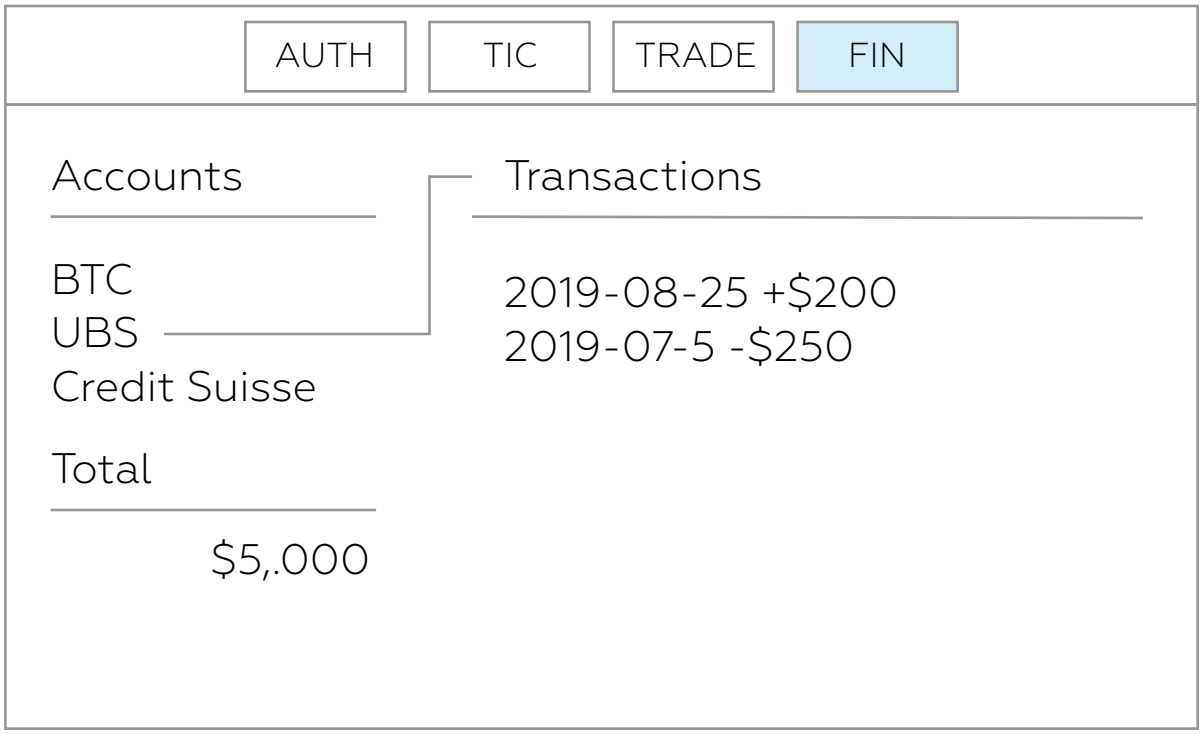
1.7. WALLET



EX/ARCH ERLANG ELIXIR

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2.EXHANGE ARCHITECTURE

— High Performance Network Router
— WebSocket real time endpoints
— Matching Engine
— L3 Order Book Assembling
— Formatters agnostic schema

INTRODUCTION

Erlang and Elixir has a know track of FIX and crypto expertise. We rely on proven telecommunication practices for developing real-time applictions.

2.1. NETWORK ROUTER

As of network router we use N2O that is know to be the king in Erlang world for WebSocket applications. It can serve C50K at lowest MacBook Air and is know to be scalable. Some projects that are using N2O:

— https://explorer.axel.network (Blockchain Explorer)
— https://pb.ua/depozit (scaled to 30M clients)
— https://n2o.tech/jp/dseg.htm (Trading Appliances)
— https://nynja.io (Cryptomessanger)

and many more...

2.2. MATCHING ENGINE

Order maching in Trade Engine is implemted using in-memory BTree structures (ETS tables) which is known to be not only fastest indexing mechanism in Erlang but also powerful enough to implement waltzdb test-suite for RETE algorithms that is known to be not parallelized. Trade maching engine is also a backend for TRADE EX/UI pages. You can see RETE implementation of waltzdb here:

— https://github.com/enterprizing/rete
— https://github.com/enterprizing/trade

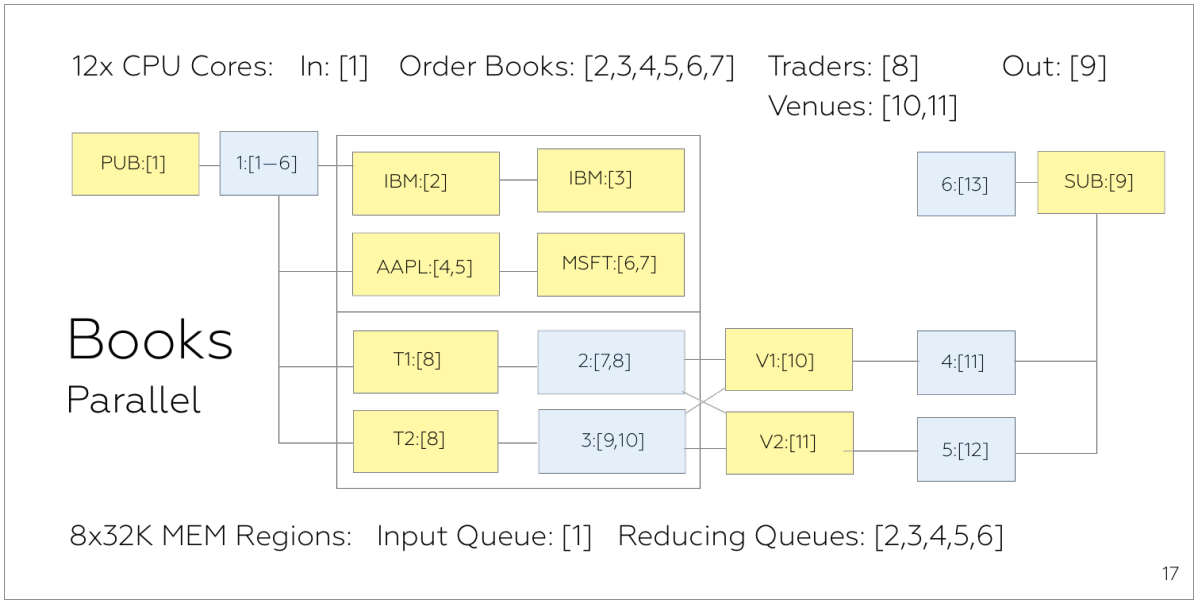
2.3. ORDER BOOK ASSEMBLY

Order Book algorithm is implemented as part of Market Data Unification Module or Crypto Liquitity Integrator TIC. For now it unifies Bitmex, GDAX and OKCoin exchanges. For EX we are going to implement even faster version as Order Book assembling is essential subroutine for all exchanges (L3 for maching trades). You can see TIC implementation here:

— https://github.com/enterprizing/tic

2.4. ORDER BOOK SHARING AMONG TRADERS

The crusial for exchange is the fast ticker order book sharing between traders sessions.



2.5. FORMATTER AGNOSTIC

Thanks to BERT module we can expose JSON/XML and any formatter atomatically:

— https://github.com/synrc/bert

2.6. REAL TIME APPEND LOG

As for database storage for the sake of availability we use RocksSB library and its stream interface for Erlang and Elixir KVS:

— https://github.com/synrc/kvs

2.7. NITROGEN WEB FRAMEWORK

NITRO is a boosted version of Nitrogen Web Framework created by Rusty Klohouse. It allows to manipulate DOM directly from server and is the best and fastest Erlang/Elixir web framework for pure real-time WebSocket applications.

— https://github.com/synrc/nitro

3. HEX.PM libraries for EX application

The future MVP will be placed into the following repositories:

— https://hex.pm/packages/bert
— https://hex.pm/packages/kvs
— https://hex.pm/packages/n2o
— https://hex.pm/packages/nitro
— https://hex.pm/packages/rocksdb
— https://hex.pm/packages/tic
— https://hex.pm/packages/trade
— https://hex.pm/packages/fix
— https://hex.pm/packages/ex

3.1. N2O SPACE

For more information about N2O family (libraries and applications) consider following sources:

— n2o.dev — Erlang User Manuals
— n2o.systems — Erlang Business Apps
— o7.network — Elixir Business Apps
— n2o.space — Erlang and Elixir for Business
— n2o.tech — N2O Type Specification
— n2o.cloud — N2O Cloud