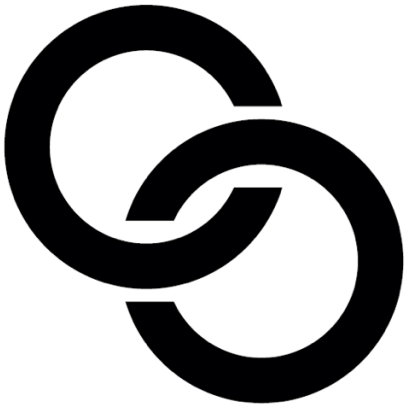


CRYX

# Cryptocurrency Market Indexes and Data Solutions

Last Revision: February 18th, 2018.

CRYPTOCURRENCY MARKET INDEXES AND DATA SOLUTIONS

GITHUB.COM/CRYXINDEX/CRYX

This research was carried out under the supervision and financial support of CRYX Ltd within a total of one year.

*First release, February 2018*

CRYX

# Contents

# 1. Summary

## 1.1 Introduction

Human nature has always been striving to seek new innovative ways to redefine its designated economic system. The appearance of blockchain and its first digital currency - the bitcoin - was merely viewed as a pebble in the pond when it was first conceptualized by Satoshi Nakamoto in 2008. One can only agree that it was the case for some times, no major centralized instructions were even considering its existence, and its impact on the real market was doubtful at best. Less than a decade later, bitcoin and other cryptocurrencies that kept on emerging one after another have managed to make themselves slowly recognized by the public. This is still the early ages of decentralized power but it is important to understand that it is happening. The cryptocurrency market is now booming after few years of slow development, reaching its all-time high 830 billion USD market capitalization in January 2018 from 15 billion USD one year ago. The amount of digital currencies and digital assets in circulation is surging and the traded volumes have yet never been so high than the past couple of months. While the optimist would only acknowledge this trend as investors and users taking a liking to all the proposed initiatives, blockchains and brilliant projects arising from various companies, the pragmatic would seek to analyze these changes with a wide open mind.

Major financial newspapers and institutions are now getting slowly but surely interested in the blockchain and the cryptocurrencies. The blockchain will be the tool to adapt to the future economy; all the major actors are starting their own lab or looking for partners, that's the case for example with the Consultancy company Deloitte Joining the Blockchain Consortium Ethereum Alliance. While blockchain itself is yet to gain recognition, the cryptocurrency market is not only booming because investors and users believe in the project or in the proper use of these assets. Like with any items that humans value, they deface their true meaning to see it as a potential speculative investment.

In the modern society, investors are not only looking for performance from their investments, they also want to understand if the decisions they took are meaningful and if the strategies they applied are actually better than passive investments. Why would you be bothered by such a statement as long as your investment is giving comfort that you are earning money? As an individual investor, this might not matter so much - and this is even debatable - but if you were to invest your money in a fund via an asset manager or any kind of financial company, you would be willing to earn more than you would by simply following the market by yourself. In the finance industry you do not only want to obtain performance, you want to be sure that it is better than your peers, your competitors, and particularly better than the market. How could you face the

investors from your hedge fund if your positive annual returns were in fact lower than investing solely on the S&P500 stocks without applying any strategy to this model? Investors would inevitably withdraw their funds, they are paying you for better returns, not for good returns.

These indicators of performance are generally known by Indexes or Benchmarks, provided by a number of different institutions such a S&P, MSCI, FTSE Russell, etc... They are used by investors, asset managers, hedge funds, pension funds, etc... to prove that what they offer is better than just investing passively in the market. These indexes have been created across all asset classes and financial instruments to determine how well or how bad a portfolio or a fund is performing in comparison to the market. This is a crucial element to determine true performance from an investor perspective.

Nonetheless, with the growing amount of cryptocurrencies recently surging in the cryptocurrency market, it is surprising that common index providers still have not reacted to offer Indexes that represent the cryptocurrency market like the STOXX Europe 600 would do for the European stocks as an example. A new kind of asset of great public interest has arisen and the necessity to create market-representative indexes seemed necessary.

## 1.2 Mission Statement

> Our mission is to support investors via benchmarking and data solutions to help them have an accurate view of the cryptocurrency market environment so that they can manage and build better portfolios

The CRyptocurrencY indeX (i.e. CRYX) is a benchmark defining best how the cryptocurrency market evolved through time and how it is looking at a precise point in time or across a defined period. Our purpose is to provide a wide range of indexes (so called the "CRYX Series") applied to the cryptocurrency market and help investors in their investment decisions. The aim of these indexes is purely to give investors a comparison point between how they managed their investments against a market-neutral strategy. The "CRYX Series" are by no mean an advice to investor nor a guide for future performance. We propose a methodology that quickly react to market changes and therefore enables us to better represent the cryptocurrency market. Indeed, the cryptocurrency market has a number of particular characteristics such as a high standard deviation of prices, volume volatility and a high number of new entries hitting the market regularly. That's why, in order to build market-representative indexes, we have built a specific methodology.

## 1.3 Core Objectives

### 1.3.1 Providing Various Ranges of Indexes and Data

Our choice is to initially offer three ranges of indexes, each having different calculation methods (i.e. Cap-weighted, Equal-weighted, Exponential flattening - FLEX) with a fixed number of cryptocurrencies. After thoroughly analyzing the current market space, we have decided on the most relevant numbers of index constituents being 5, 10, 25, 50, and 100. This is what our initial offering will be at first, but as time passes and the market shifts one way or another, we will endeavor to meet client appetite for newer ranges of indexes and even customized solutions. The reallocation of the constituents will be on a daily basis in order to better react to the dynamic market changes. This reallocation takes in consideration the market capitalization and the liquidity of every cryptocurrency.

We have chosen to provide different calculation methods for each of our indexes in order to provide index adapted to different portfolio strategies. Our initial three ranges of indexes will support every user in their choice to find the most relevant index to use as a benchmark for their strategies.

We are also willing to produce "customized indexes" for investors that have very particular needs that cannot be satisfied with our current offering at any point in time.

### 1.3.2 Developing a Strong Community

The main objective of our platform will be to provide data and a number of analyses, however building a strong community is also substantial in our project. We believe that CRYX's community development is essential in the entire development of the CRYX Project.

CRYX community has a vocation to allow members to share with their peers and have access to new services, via a unique profile.

The community's forum will allow you to discuss and debate with every member of the CRYX community on specific topics related to the cryptocurrency market.

### 1.3.3 Creating Analytic Tools

The CRYX forum will give the possibility to its members to upload their diverse analyses; nonetheless, the CRYX staff aims to also provide their quantitative analyses and empirical studies via our community interface. The scope of these studies/analysis is limited to the cryptocurrency market and has no vocation to be an advice.

Our analyses will be carried out by our Research team. We would like to provide to our community some insights of the market and some updates on the current cryptocurrency market behavior. To do so, we have decided to split our Analysis division under three categories:

- Fundamental Analysis: Cryptocurrency's White Papers library + Business Model / Project analysis.
- Technical Analysis: Price and Volume Analysis trough technical indicators and graphical patterns.
- Quantitative Analysis: Analysis that aims to understand or predict behavior or events through the use of mathematical measurements and calculations, statistical modeling and research.

You will then, via a unique profile identification, be able to follow a specific Analyst profile, a specific cryptocurrency or the whole community and the entire cryptocurrency market.

### 1.3.4 Backtesting Tools and Machine Learning

The CRYX platform will also be a place where you will be able to test your investment and trading strategies. Our high-quality database will provide the necessary information to analyse market prices through a very short timescale as well as a longer time period. We will deliver a dedicated platform that will allow you for:

- Backtesting CRYX Benchmarks
- Backtesting Ad-Hoc cryptocurrency buckets with the CRYX methodology
- Backtesting Technical Indicator Strategies on a single cryptocurrency
- Machine Learning applied to price and trend forecasting

# 2. CRYX Methodologies and Index Ranges

## 2.1 Index Ranges

### 2.1.1 Cap-Weighted


Figure 2.1: The logo for the CRYX Cap-Weighted Index Range

This index range will be tracking the cryptocurrency market based on each individual market capitalization. The major currencies will have larger impact on the performance returns than assets with lower market capitalization.

The Cap-Weighted index range will be particularly useful for investors who want to compare their portfolio against the real shape of the cryptocurrency market. It can be also used to support asset-allocation, research and performance measurements.

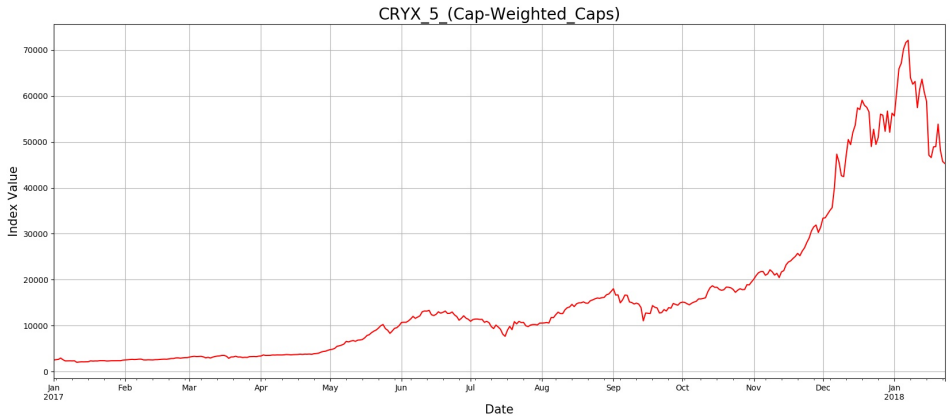



Figure 2.2: Graph depicting the CRYX Cap-Weighted Index Range using the CRYX5 (starting from 2015-01 to 2018-01)

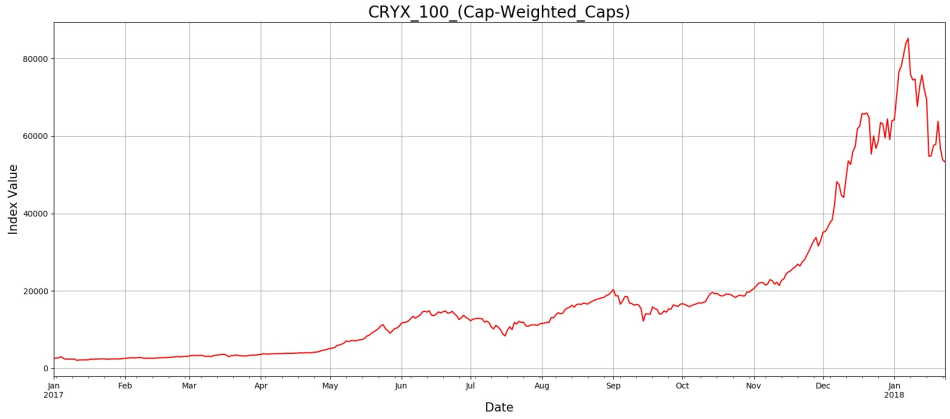



Figure 2.3: Graph depicting the CRYX Cap-Weighted Index Range using the CRYX100 (starting from 2015-01 to 2018-01)

### 2.1.2 Equal-Weighted

CRYX

Figure 2.4: The logo for the CRYX Equal-Weighted Index Range

This index range offers an alternative from the Market Capitalization range of indexes. The Equal-Weighted index range is purposely erasing the market capitalization factor from each asset in order to achieve a simple

goal – all the assets weights are equal.

All the cryptocurrencies will be represented with equal weights is order to avoid concentration of a portfolio into the largest.

The Equal-Weighted index range is the perfect definition of the well-known idiom *"Don't put all your eggs in one basket"*. The aim is to limit your exposure to the highest cryptocurrencies and by equalizing your holdings investors are expecting their performance to not be only driven by the main cryptocurrencies.

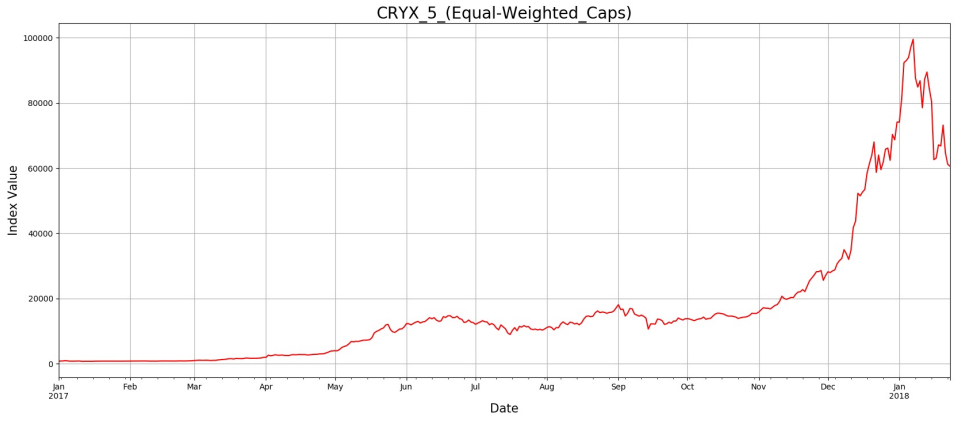



Figure 2.5: Graph depicting the CRYX Equal-Weighted Index Range using the CRYX5 (starting from 2015-01 to 2018-01)

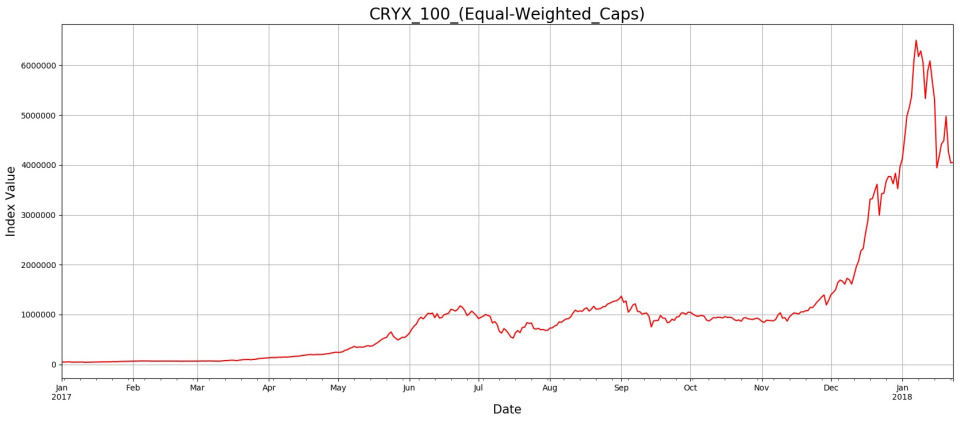



Figure 2.6: Graph depicting the CRYX Equal-Weighted Index Range using the CRYX100 (starting from 2015-01 to 2018-01)

### 2.1.3 EXponential FLattening – i.e. FLEX

Figure 2.7: The logo for the FLEX Index Range

This third index range is a new and more experimental kind of benchmark. FLEX stands for "EXponential FLattening". We have developed our own method to calculate an index that is not purely driven by market capitalization but is neither fully equalized.

This particular range of indexes aims to reduce the market value impact of the cryptocurrency and reduce the overbearing weights of the top cryptocurrencies and increase the weights of the smaller ones to increase their contribution to returns.

The FLEX range benefits from both the Cap- and Equal-Weighted ranges. It suits perfectly for those that do not want the top cryptocurrencies such as Bitcoin and Ethereum to drive all their portfolio returns, but also do not believe that much smaller cryptocurrencies should be considered as equally significant.

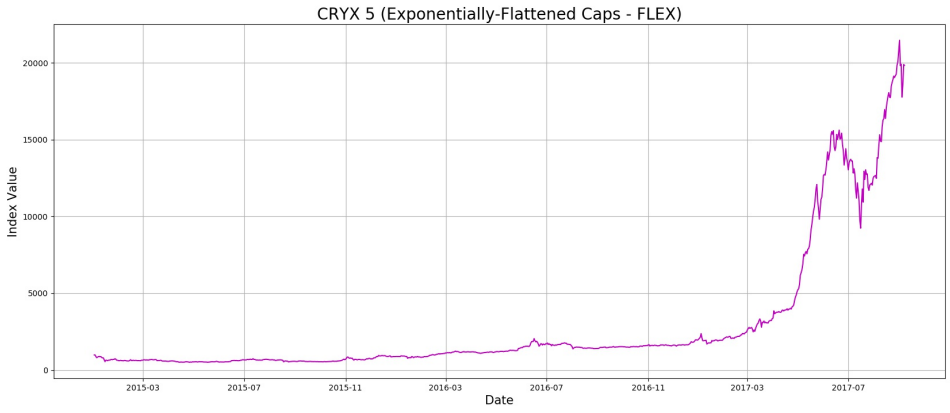



Figure 2.8: Graph depicting the CRYX Exponentially-Flattened FLEX Index Range using the CRYX5 (starting from 2015-01 to 2018-01)

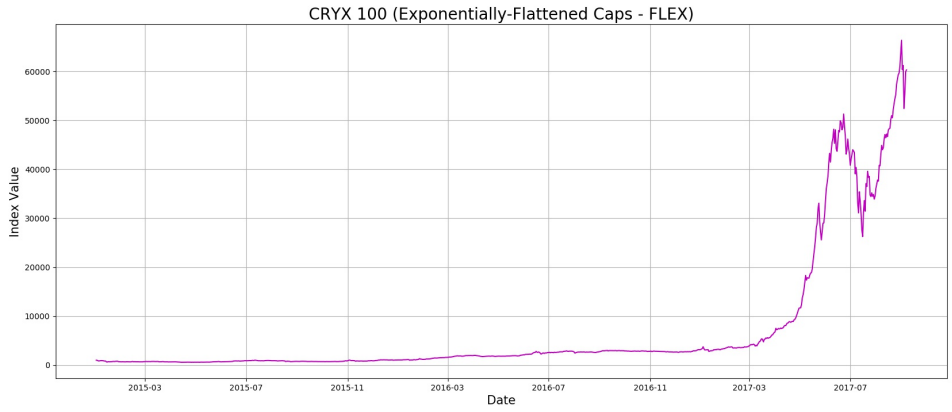



Figure 2.9: Graph depicting the CRYX Exponentially-Flattened FLEX Index Range using the CRYX100 (starting from 2015-01 to 2018-01)

### 2.1.4 A Comparison Between the Three Ranges of Index

Below are depicted the three different ranges of Index in order to thoroughly inspect the variations between them.

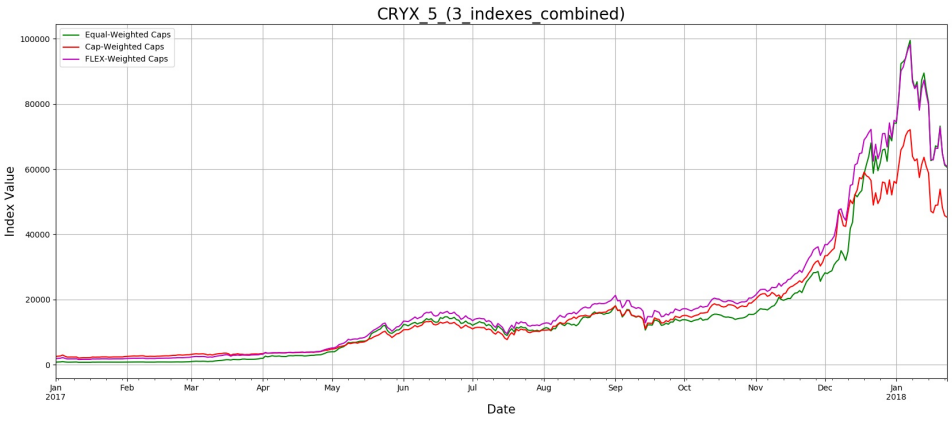



Figure 2.10: Graph depicting the three different ranges of Index using the CRYX5 (starting from 2015-01 to 2018-01)

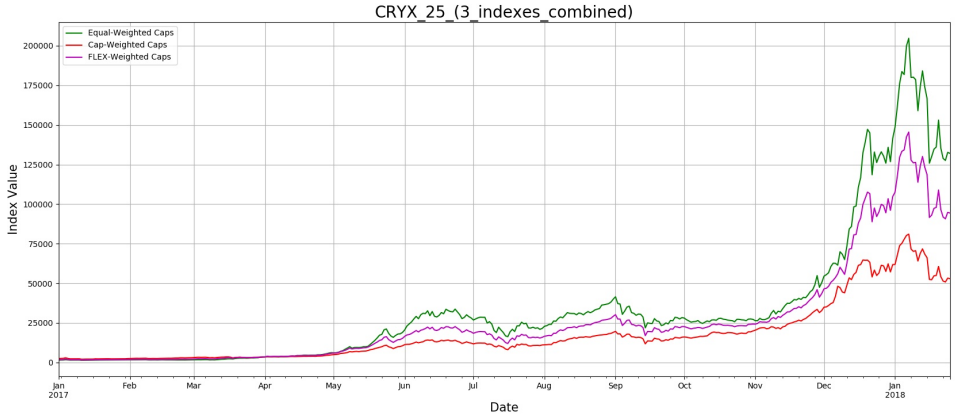



Figure 2.11: Graph depicting the three different ranges of Index using the CRYX25 (starting from 2015-01 to 2018-01)

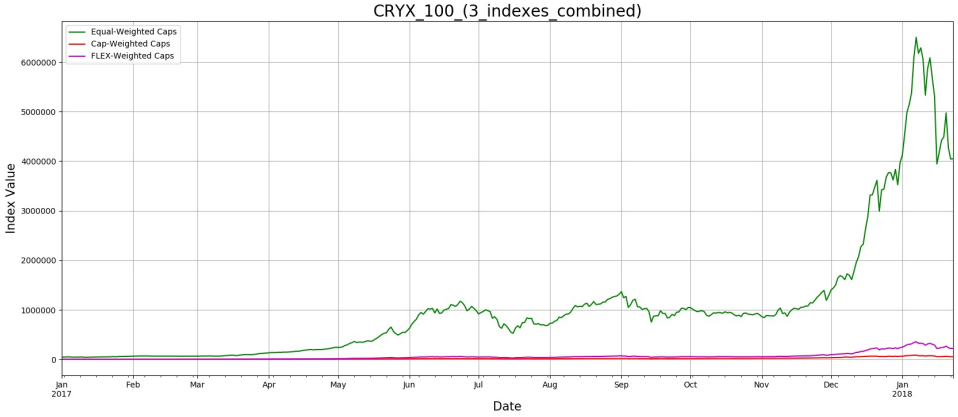



Figure 2.12: Graph depicting the three different ranges of Index using the CRYX100 (starting from 2015-01 to 2018-01)

## 2.2 CRYX Methodologies

This section will detail and describe the indexes methodologies developed for each of the CRYX Indexes Ranges.
It shall explain the guidelines and rules set to maintain and construct these Indexes. It is important to highlight that the CRYX management committee might consider desirable to perform operational adjustments to the methodologies in order to maintain the objectives of these Indexes at their discretion.

### 2.2.1 Calculation of the Price Indexes

Price returns is the base of the indexes calculation.
The indexes calculation is as follows:
Index constituents' prices multiplied by its defined weight divided by the so called divisor.

### 2.2.2 Currency Conversion

USD will be the base currency of all the indexes calculation. All the cryptocurrencies part of these indexes will have their value converted to USD in order to perform the indexes level calculation.
We will also convert the index levels to various other currencies using the last known exchange rate observed on the market at the time of the calculation.

### 2.2.3 Definition of the Eligible Securities and Selection Principles

The CRYX universe will be all of the cryptocurrencies available for trading at the time of the calculation.
To be selected as a constituent of the CRYX indexes, the cryptocurrency will need to meet two criteria:
- Trading Liquidity: it needs to be higher than a certain threshold pre-determined for each indexes.
- Total Market capitalization: it defines its ranking within the cryptocurrency market.

The cryptocurrencies that meet both "Trading Liquidity" and "Total Market Capitalization" criteria will become constituents of the index and follow its inclusion methodology.

### 2.2.4 Update Frequency

All the indexes will be rebalanced on a daily basis at 5PM GMT. It means that each indexes will have its constituents list updated at this time to allow the index to be the most real reflection of the cryptocurrency universe as often as possible.
The indexes levels will be recalculated every 5 minutes. The indexes levels will then be used to calculate indexes returns over various periods of time.

### 2.2.5 Indexes Types, Construction and Number of Constituents

We currently calculate various ranges of indexes with a pre-set number of constituents which are 5,10,25,50 and 100.
The trading liquidity threshold for these indexes is set at 5% of the Total Market Value per annum. Any cryptocurrency that doesn't follow this rule won't be included in the indexes.
Each of our ranges have a different purpose and few variations.

- **Equal-Weighted Indexes:**
  These indexes show the returns of a fictional portfolio invested in a pre-set number of constituents which will be adjusted to have the same weight ratio to attributed to their assets values. These indexes will be rebalanced every day and are free of transaction cost.

  The mathematical formula that reflects the weight $w_i$ of each asset of an index constructed with N assets is :

$$\forall i \in [1,N], w_i = \frac{1}{N}$$

The purpose of the equal weighted indexes is to remove the market capitalization effect of each constituents, therefore all cryptocurrencies have the same weight ratio applied to the index calculation after being selected.

- **Cap-Weighted Indexes:**
These indexes show the return of a fictional portfolio invested in a pre-set number of constituents selected within the cryptocurrency universe. The weight of each constituents will be determined by its market capitalization.

The mathematical formula that reflects the index capitalization of an index constructed with N assets is:

$$M = \sum_{i=1}^{N} M_i$$

here the global capitalization of the asset i is $M_i$.
Therefore, the weight $w_i$ of each asset is:

$$\forall i \in [1,N],$$

$$w_i = \frac{M_i}{M}$$

The purpose of the asset weighted indexes is to show the true reflection of the cryptocurrencies market at a given time. They are composed of the assets that bear the highest market values at the time of their calculation. The Bitcoin has the biggest impact and weight in this type of indexes.

- **Exponential Flattening Indexes (FLEX):**
These indexes show the return of a fictional portfolio invested in a pre-set number of constituents.
The FLEX weight $w_i$ of each asset is:
$\forall i \in [1,N]$,

$$S = \sum_{i=1}^{N} \sqrt{\left(\frac{M_i}{M}\right)}$$

thus, each square root weight is:

$$w_i^{SR} = \frac{\sqrt{\left(\frac{M_i}{M}\right)}}{S}$$

In order to slightly keep the same structure as the market cap index, we apply a bit more weight to the large names and a bit less weight to the small names, by doing the following:

$$SumEXP = \sum_{i=1}^{N} (e^{w_i{}^{SR}} - 1)$$

In this way, each allocated weight in the index is the following:
$\forall i \in [1,N]$,

$$w_i^{FLEX} = \frac{e^{w_i{}^{SR}} - 1}{SumEXP}$$

This particular range of indexes aims to reduce the market value impact of the cryptocurrency and reduce the overbearing weights of the top cryptocurrencies and increase the weights of the smaller ones to increase their contribution to returns.

### 2.2.6 Comparison of the Three Methodologies

This weights calculation method allows the construction of an index in which the weight of each asset is proportional to the asset's market capitalization.
As it can be seen on the Figure below, the use of exponential factors reduces the individual contribution of the biggest currencies, and increases the contribution of the smallest ones.

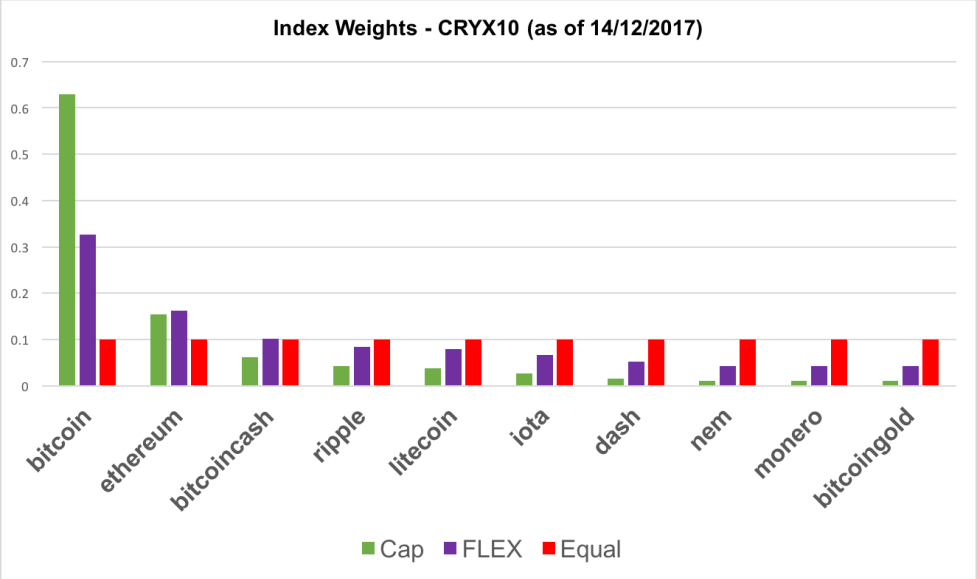



Figure 2.13: CRYX 10 Weights (data as of 24/08/2017)

The resulting index still accounts for the differences in market capitalization between the currencies, but is not as dependent on a few outliers as an asset weighted index.

### 2.2.7 Indexes Variations from One Period to the Next

Each range of indexes will apply a different weighting methodology to its calculation. Once this has been done, the index returns are calculated as the weighting average returns of index constituents over the period selected.

# 3. CRYX CVX and CRYX CCS

## 3.1 CRYX Cryptocurrency Volatility Index (CVX)

The CRYX Cryptocurrency Volatility Index, known by its ticker symbol CVX, is the standard measure of the cryptocurrency volatility. It is commonly referred to as the "fear index".

### 3.1.1 What is the CRYX Cryptocurrency Volatility Index (CVX)?

One of the main driver of returns for investors on the cryptocurrency market is undoubtedly the volatility. The cryptocurrency market is very special in this aspect: there are huge rises and drops happening through the days, large shift in price directions from one minute to another, and overall volatility of the cryptocurrencies are way higher than any other financial asset have ever been. Volatility is indeed one of the biggest risk factor that cause investors to be relatively cautious on such markets or asset class, but it can also be driving investment decision if utilized wisely.

Individual cryptocurrency volatility can already be analysed with a number of our indicators via our Online Technical Indicators Visualization Tool or another other mean mostly through price analyses. Historical volatility of specific cryptocurrency can easy be determined, but looking at all the individual cryptocurrencies from a specific market universe can be tedious and relatively long to achieve. While most of the volatility technical indicator tends to be graphical, they are relatively easy to interpret individually but looking at 50 different cryptocurrencies would take time and correlation would be hard to interpret. If 25 cryptocurrencies have low volatility but 25 others have large volatility, it would be hard to get the overall cryptocurrency market picture, is it being volatile or not?

The CRYX Cryptocurrency Volatility Index (CVX) is aiming to measure the volatility of the top 50 cryptocurrencies over a 3 weeks rolling period. The CRYX Cryptocurrency Volatility Index also integrate our

"FLEX" weighting methodology in other to smooth the market values from the top 50 cryptocurrencies and allow a better overall impact of each cryptocurrency volatility. Momentum based theory could apply to the CRYX Cryptocurrency Volatility Index calculation and it might be able to determine expected future volatility of the cryptocurrency market.

### 3.1.2 Methodology

The aim of the CRYX Cryptocurrency Volatility Index (CVX) is to assess the degree of volatility of the 50 largest market capitalizations of the cryptocurrency market.

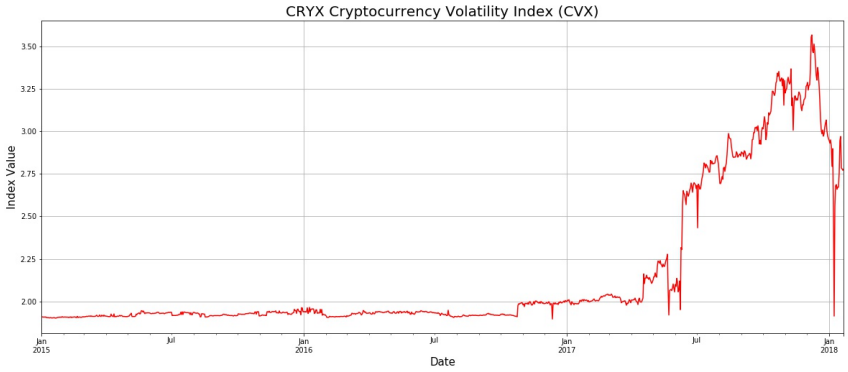



Figure 3.1: CRYX Cryptocurrency Volatility Index (CVX) Value as of 22/01/2018

The way CVX is calculated is by taking the 21-days rolling standard deviation of the largest 50 market capitalizations that have been weighted according to the exponential of the square root (i.e. the FLEX methodology) of their market capitalizations.
$\forall i \in [1,50]$,

$$r_i = Returns_i[t-20:t]$$

Then, find the standard deviation of each name's returns:

$$s_i^2 = \sqrt{\sum_{t=1}^{n}(r_t - \bar{r}_i)^2}$$

The FLEX weight $w_i$ of each asset is:
$\forall i \in [1,50]$,

$$S = \sum_{i=1}^{50} \sqrt{\left(\frac{M_i}{M}\right)}$$

thus, each square root weight is:

$$w_i^{SR} = \frac{\sqrt{\left(\frac{M_i}{M}\right)}}{S}$$

In order to slightly keep the same structure as the market cap index, we apply a bit more weight to the large names and a bit less weight to the small names, by doing the following:

$$SumEXP = \sum_{i=1}^{50}(e^{w_i{}^{SR}} - 1)$$

In this way, each allocated weight in the index is the following:
$\forall i \in [1,50]$,

$$w_i^{FLEX} = \frac{e^{w_i{}^{SR}} - 1}{SumEXP}$$

Finally, the aim is to take the average of all the names' standard deviations accordingly weighted with their "FLEX" weights:
$\forall i \in [1,50]$,

$$CVX\_Price = \frac{s_i^2 \times e_i^{FLEX}}{\sum_{i=1}^{50}(s_i^2 \times e_i^{FLEX})}$$

### 3.1.3 Interpretation

The calculations and methodology behind the index can look rather complicated to non-expert, however the CVX can be graphically analysed relatively easily. When the index value goes up, volatility over the past period has been higher than from the previous calculation point, and expected near term volatility should be potentially increasing. When the index value goes down, volatility over the past period has been lower than from the previous calculation point, and expected near term volatility should be potentially decreasing.

Let us take a concrete example from the current CVX Chart available on our Alpha platform. The CVX as of Jan 1st 2017 was 2.01, a year later it was 2.98. Even though the cryptocurrency market has relatively evolved in this one-year gap, volumes have increased and daily trading is larger, the volatility itself has also gone up generally. Comparing this point really says that the 30 days volatility of the top 50 cryptocurrencies before January 18 was 48% higher than the 30 days volatility of the top 50 cryptocurrencies before January 2017.

## 3.2 Cryptocurrency Classification Standard (CCS)

### 3.2.1 Definition

The cryptocurrency market is still new and very fast paced, new projects and cryptocurrencies are released daily and even though they are relatively similar in many technical aspects, their purposes are very different and they do not seek the same public and evolve on several economic sectors. Our indexes are indeed fictional portfolios that are diversified and can hold a number of cryptocurrency intrinsically different. It seemed important for us to split cryptocurrencies that do not behave the same way in order to try to understand their performance behaviour. For example, some cryptocurrencies are designed to be used only a peer to peer digital currency across the world, while others can be used only on closed network to use some services.

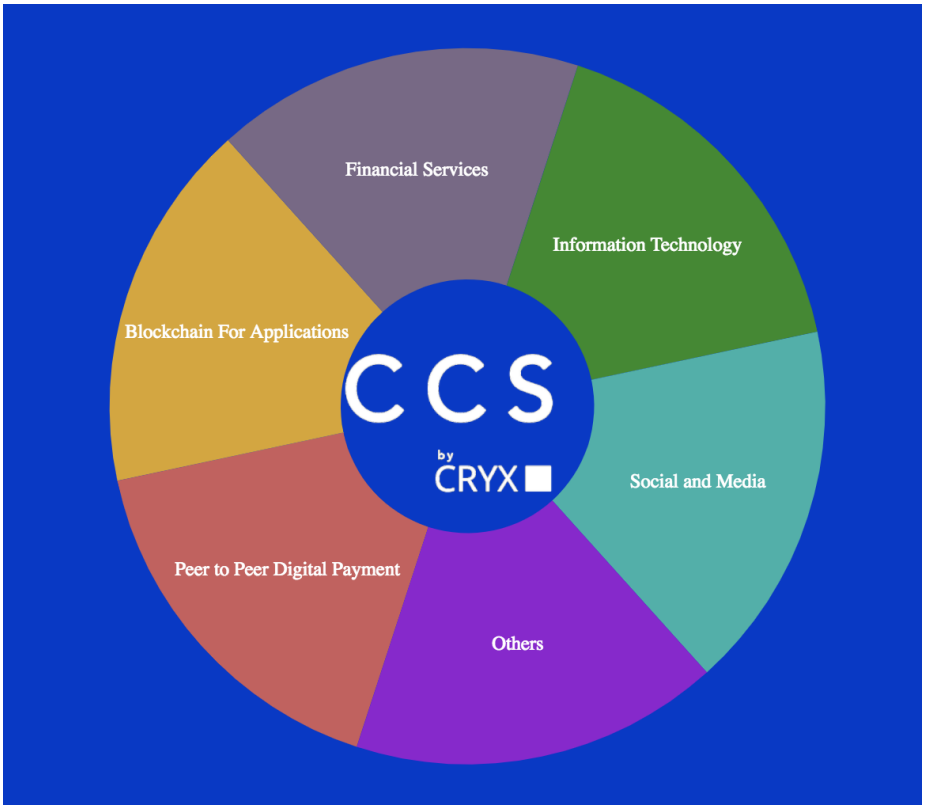



Figure 3.2: CRYX Cryptocurrency Classification Standard (CCS)

In order to help us separate and regroup cryptocurrency into similar categories, we created a first preliminary draft of our own cryptocurrency categorisation the Cryptocurrency Classification Standards.

The primary use of the Cryptocurrency Classification Standard (CCS) will be to determine the weight of each asset categories into our range of indexes.

A future potential use could be to create index linked to a unique classification, calculate classification returns and contribution to allow cryptocurrency market analysis or simply to understand a cryptocurrency purpose at first glance without diving into complex whitepaper analysis.

### 3.2.2 Scope

We currently are reviewing every cryptocurrency that are part of the constituents list of our indexes at any point in time. Our first draft of the Cryptocurrency Classification Standard (CCS) is composed of six categories that will be described further later. At the moment, the major cryptocurrencies on the market are relatively concentrated into few categories.

We indeed noticed that increasing the size of our scope to the whole cryptocurrency universe would force us to create an additional number of categories that would be irrelevant or immaterial to our current indexes constituent environment. We might envisage extending the scope in the future if we believe there is an interest for it.

### 3.2.3 Categories In More Detail

In this section, we will summarize what each category mean and what kind of cryptocurrencies will be allocated to such classification.

#### 1. Peer-to-Peer Digital Payment

The P2P Digital Payment classification aims to regroup all the cryptocurrencies that have one common goal: to become a decentralized digital payment currency and get rid of the regular banking system.

Such cryptocurrencies usually come with different features but their ultimate purpose is simply to exchange value between people and companies. This was also the first purpose of the cryptocurrency world, and its first flagship is still the Bitcoin that is the largest cryptocurrency currently available on the market.

#### 2. Blockchain for Applications

The second classification aims to gather the cryptocurrencies whose main use is on a blockchain platform that design smartcontracts and applications directly or allow users to create their own private blockchain environment and tokens to use on their own smartcontracts and applications.

These cryptocurrencies are linked to a blockchain infrastructure that is more complex and is needed as main fuel on these blockchains. Here too we find various technology that competes to be the most efficient blockchain platforms for applications.

The best example of such cryptocurrencies would be Ethereum as it is the second largest cryptocurrency in term of market value. Dozens of tokens have been created on its blockchains and a large number of smartcontracts have been coded.

#### 3. Financial Services

From this third classification, classification we start to merge a number of various activities relatively varied. The Financial Services classification aims to bring together all the cryptocurrencies that are used within the Banking and Finance industry and all the services linked to speculation and investment.

You will find in that classification the cryptocurrencies used for market exchange and trading platforms, digital banking, online betting, etc,...

Its model cryptocurrency would be the Ripple and its Institutional cross-border settlement platform.

#### 4. Information Technology

The Information Technology classification seeks to aggregate all the cryptocurrencies used on platforms that specialize into data manipulation and computer resources sharing generally. You can find platform that allow cloud and data storage, sentiment data collection, computer power sharing, prediction and forecasting tools, etc,...
We will mention two cryptocurrencies to illustrate this classification: Storj that is a cloud and data storage service, and Augur for its prediction markets and forecasting tools.

#### 5. Social and Medias

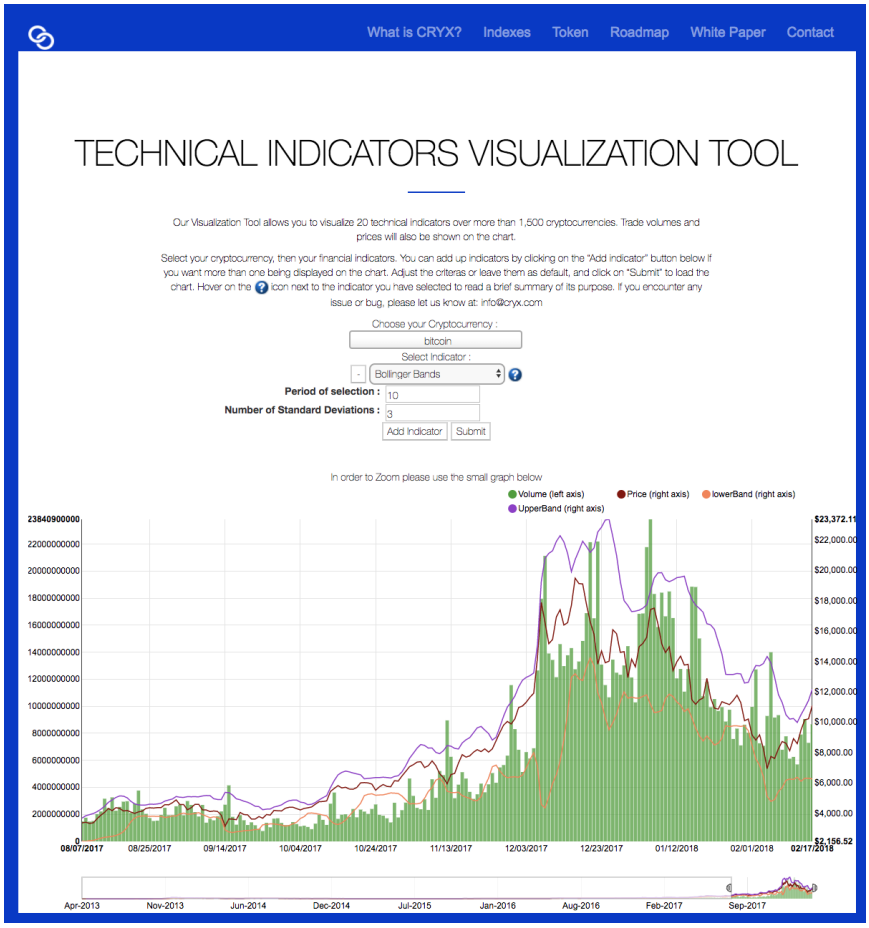
The Social and Medias classification regroups all the cryptocurrencies that are used on platform that specialize communications and rewards system. You would find platforms that want bring a specific community together where you can reward other members of this community for their work, performance, messages or simply if you feel like it, but also all kind of medias or marketing agency for example. One example of such community reward system would be Steem where users are rewarded for the content they produce.

#### 6. Others

This last classification regroups all the remaining cryptocurrencies that do not fit in any of the previous categories. Given our current scope of the Cryptocurrency Classification Standard (CCS) it would be irrelevant or immaterial to create more detailed categories. However, there are still a small number of cryptocurrencies that do not fit into any of the previous categories because of their peculiar specificities and uses.
Syscoin, for instance, would not fit anywhere else with its features. Real goods are traded on this market place and it relies on its tokens as main exchange currency.

# 4. Technical Indicators - Visualization Tool

Analytics tools and technical indicators are available on the CRYX Platform for forecasting the direction of every cryptocurrency price through the study of past price and volume.



The following technical analyses are ready and free to use.

## 4.1 Trend Indicators

A market trend is an observed tendency of financial markets to move in a particular direction over time. The "Trend indicators" available on the CRYX platform are the following:

**a. Average Directional Index - ADX**

The Average Directional Index (ADX) is a combination of two indicators developed by Wilder: the Positive Directional Indicator (i.e. +DI) and Negative Directional Indicator (i.e. -DI). The A.D.X. merges them and flattens the result with a smoothed moving average. In order to calculate +DI and -DI, price data of High, Low, and Closing prices for each period is required. The directional movements +DM and -DM are calculated as follows:

UP Move = Today's High - Yesterday's High
DOWN Move = Yesterday's Low - Today's Low
If UP Move > DOWN Move and UP Move > 0, then +DM = UP Move, else +DM = 0
If DOWN Move > UP Move and DOWN Move > 0, then -DM = DOWN Move, else -DM = 0

After selecting the number of periods (as an example, Wilder used 14 days), +DI and -DI are defined as:
+DI = 100 times the smoothed moving average of (+DM) divided by the Average True Range
-DI = 100 times the smoothed moving average of (-DM) divided by the Average True Range
The Smoothed Moving Average is then calculated throughout the number of periods selected, and the Average True Range is a smoothed average of the true ranges.
Then:

A.D.X. = 100 times the smoothed moving average of the absolute value of (+DI minus -DI) divided by (+DI plus -DI)

**b. Commodity Channel Index - CCI**

CCI measures a security's variation from the statistical mean.

The CCI is calculated as the difference between the typical price of a commodity and its simple moving average, divided by the mean absolute deviation of the typical price. The index is usually scaled by an inverse factor of 0.015 to lead to more understandable numbers:

$$CCI = \frac{1}{0.015}\frac{p_t - SMA(p_t)}{\sigma(p_t)}$$

where SMA is the simple moving average, and $\sigma$ is the mean absolute deviation
and where the $p_t$ is the:

$$\text{Typical Price} = \frac{H+L+C}{3}$$

**c. Moving Average Convergence/Divergence - MACD**

The MACD indicator (or "oscillator") is a group of three different time series calculated from historical price data, usually the closing price. These three series are: the "MACD" series proper, the "Signal" or "Average" series, and the "Divergence" series which is the difference between the two.
The MACD series is the difference between a "Fast" (i.e. Short Period) exponential moving average (EMA), and a "Slow" (i.e. Longer Period) EMA of the price series. Finally, the average series is an exponential moving average (EMA) of the MACD series.

**d. Mass Index**

Mass index for a commodity has been developed by Donald Dorsey in the early 1990s and is achieved by

computing its exponential moving average over a 9-day period and the exponential moving average of this average (i.e. a "double" average), and by summing up the ratio of these two throughout a certain number of days (i.e. most often 25).

$$Mass = Sum[25]\ of\ \frac{EMA[9]\ of\ (high - low)}{EMA[9]\ of\ EMA[9]\ of\ (high - low)}$$

Dorsey hypothesized that, when the figure jumps above 27 – thus creating a “bulge” – and then drops below 26.5, the stock is ready to change course. An index of 27 would represent a quite volatile stock.

**e. TRIX**

TRIX shows the slope (i.e. derivative) of a triple-smoothed exponential moving average. The name TRIX comes from "TRIple eXponential".
TRIX is calculated for a given N-day period as follows:

- Smooth prices (most often using Closing prices) using an N-day exponential moving average (EMA)
- Smooth this series using another N-day EMA
- Smooth a third time, using a further N-day EMA
- Calculate the percentage difference between today’s and yesterday’s value in that final smoothed series

The easiest way to calculate the triple EMA based on successive values is just to apply the EMA three times, creating single-, then double-, then triple-smoothed series.
The Triple EMA can also be calculated directly with prices as follows:

$p_0$ today’s close, $p_1$ yesterday’s, etc., and with $f = 1 - \frac{2}{N+1} = \frac{N-1}{N+1}$ (as for a plain EMA):

$$Triple\ EMA_0 = (1-f)^3(p_0 + 3fp_1 + 6f^2p_2 + 10f^3p_3 + \dots)$$

The coefficients are the triangle numbers, $n(n+1)/2$.
In theory, by using all historical data, the sum is infinite, but as f is less than 1 the powers $f^n$ become smaller as the series advances, and they decrease faster than the coefficients increase.

**f. Vortex Indicator - VI**

The Vortex Indicator is an oscillator composed of two lines - i.e. an UP-trend line (VI+) and a DOWN-trend line (VI-). The Vortex Indicator is used to spot trend reversals and confirm current trends. An uptrend (or buy signal) occurs when VI+ crosses above VI-. A downtrend (or sell signal) occurs when VI- crosses above VI+.
The calculation for the indicator is divided into three parts:

- 1. Uptrend and Downtrend movement:
  VM+ = Current high minus prior low
  VM- = Current low minus prior high
  VMx+ = x-period Sum of VM+
  VMx- = x-period Sum of VM-
  where "x" is the number of price periods the indicator will look at (commonly set between 14 and 30).
- 2. The True Range (TR) is the greatest of:
  Current high minus current low
  Current high minus previous close (absolute value)
  Current low minus previous close (absolute value)
  TRx = x-period Sum of TR
- 3. Normalize uptrend downtrend movement:
  VIx+ = VMx+/TRx
  VIx- = VMx-/TRx

## 4.2 Momentum Indicators

Momentum is the empirically observed tendency for rising asset prices to rise further, and falling prices to fall further. The "Momentum indicators" available on the CRYX platform are the following:

**a. Money Flow Index - MFI**

The Typical Price for each day period is the average of the High price, the Low price and the Closing price, such as:

$$typical\ price = \frac{high+low+close}{3}$$

The money flow for a given day is the Typical Price multiplied by volume on that day.

$$money\ flow = typical\ price \times volume$$

The money flow is thus divided into Positive and Negative money flow.

- Positive money flow is calculated by summing the money flow of all the days where the typical price is higher than the previous day's typical price.
- Negative money flow is calculated by summing the money flow of all the days where the typical price is lower than the previous day's typical price.

The money ratio is the ratio of positive money flow to negative money flow.

$$money\ ratio = \frac{positive\ money\ flow}{negative\ money\ flow}$$

Thus,

$$MFI = 100 - \frac{100}{1+money\ ratio}$$

The MFI can also be calculated as follows:

$$MFI = 100 \times \frac{positive\ money\ flow}{positive\ moneyflow+negative\ money\ flow}$$

**b. Relative Strength Index - RSI**

The Relative Strength Index (RSI) is a momentum indicator developed by Wilder, that compares the magnitude of recent gains and losses over a specified time period to measure speed and change of price movements of a security. The aim is to identify overbought or oversold conditions.

$$U = \text{close}_{\text{now}} - \text{close}_{\text{previous}}$$
$$D = 0$$

A down period is characterized by the close being lower than the previous period's close,

$$U = 0$$
$$D = \text{close}_{\text{previous}} - \text{close}_{\text{now}}$$

If the last close is equal to the previous, both U and D are zero.
The average U and D are calculated using an n-period smoothed or modified moving average (SMMA or MMA) which is an exponentially smoothed Moving Average with Σ = 1/period.
The ratio of these averages is the relative strength or relative strength factor:

$$RS = \frac{\text{SMMA}(U,n)}{\text{SMMA}(D,n)}$$

If the average of D values is zero, the RS value will approximate infinity, making the RSI value to be around 100. The Relative Strength factor is eventually turned into a relative strength index between 0 and 100:

$$RSI = 100 - \frac{100}{1+RS}$$

**c. Stochastic Oscillator**

The Stochastic Oscillator is a momentum indicator using Support and Resistance levels and developed by Dr. Lane. The term "stochastic" refers to the point of a current price in relation to its price range over a period of time. This method aims to forecast price turning points by comparing the closing price to its price range.
The 5-period stochastic oscillator in a daily time-frame is defined as follows:

$$\%K = \frac{(Price - L5)}{(H5 - L5)},$$
$$\%D = 100 \times (\frac{(K1 + K2 + K3)}{3})$$

where H5 and L5 are the highest and lowest prices in the last 5 days respectively, while %D is the 3-day moving average of %K (the last 3 values of %K).
Most often, this is a simple moving average, but can be an exponential moving average for a less standardized weighting for more recent values.

**d. True Strength Index - TSI**

The TSI is a "double smoothed" indicator. This means that a moving average applied to the data is smoothed again by a second moving average. The calculation for TSI uses Exponential Moving Averages (i.e. EMA). Thus, the formula for the TSI is:

$$TSI(c_0, r, s) = 100 \times \frac{EMA(EMA(m,r),s)}{EMA(EMA(|m|,r),s)}$$

where:

- c0 = today's closing price
- m = c0 - c1 = momentum (difference between today's and yesterday's close)
- $EMA(m,n) = exponential moving average of m over n periods$
- $EMA(m_0,n) = \frac{2}{n+1}[m_0 - EMA(m_1,n)] + EMA(m_1,n)$
- r = EMA smoothing period for momentum, usually 25
- s = EMA smoothing period for smoothed momentum, usually 13

**e. Williams %R**

Williams %R is a technical analysis oscillator developed by Larry Williams showing the current closing price relative to the high and low of the past chosen N days. Its aim is to indicate whether a market price is trading near the High or the Low, or somewhere in between, of its recent trading range.

$$\%R = \frac{high_{Ndays} - close_{today}}{high_{Ndays} - low_{Ndays}} \times -100$$

The oscillator is eventually on a negative scale, ranked from -100 (i.e. lowest) up to 0 (i.e. highest). A value of -100 means the close today was the lowest low of the past N days, and 0 means today's close was the highest high of the past N days.

**f. Ultimate Oscillator - UO**

The Ultimate Oscillator (UO) is a technical indicator based on a notion of buying or selling "pressure" represented by where a day's closing price is within the day's true range.

The calculation starts with "buying pressure", which is the amount by which the close is above the "true low" on a given day. The true low is the lesser of the given day's trading low and the previous close.

$$bp = close - \min(low, prev, close)$$

The true range is the difference between the "true High" and the "true Low" above. The true high is the greater of the given day's trading high and the previous close.

$$tr = \max(high, prev, close) - \min(low, prev, close)$$

The total buying pressure over the past 7 days is expressed as a fraction of the total true range over the same period. If $bp_1$ is today, $bp_2$ is yesterday, etc., then

$$avg_7 = \frac{bp_1+bp_2+\cdots+bp_7}{tr_1+tr_2+\cdots+tr_7}$$

The same is done for the past 14 days and past 28 days and the resulting three ratios combined in proportions 4:2:1, and scaled to make a percentage 0 to 100. The idea of the 7-, 14- and 28-day periods is to combine short, intermediate and longer time frames.

$$UltOsc = 100 \times \frac{4\times avg_7+2\times avg_{14}+avg_{28}}{4+2+1}$$

Williams had specific criteria for a buy or sell signal. A buy signal occurs when,

Bullish divergence between price and the oscillator is observed, meaning prices make new lows but the oscillator doesn't During the divergence the oscillator has fallen below 30. The oscillator then rises above its high during the divergence, i.e. the high in between the two lows. The buy trigger is the rise through that high. The position is closed when the oscillator rises above 70 (considered overbought), or a rise above 50 but then a fallback through 45.

A sell signal is generated conversely on a bearish divergence above level 70, to be subsequently closed out below 30 (as oversold).

## 4.3 Volume Indicators

In technical analysis, volume measures the number of a security's shares that are traded on a stock exchange in a day or a period of time. The "Volume indicators" available on the CRYX platform are the following:

**a. Accumulation/Distribution Line**

The Accumulation/Distribution Line (or Index) is a technical analysis indicator used to describe price and volume in the market with the aim of indicating price movements.

$$CLV = \frac{(close-low)-(high-close)}{high-low}$$

This ranges from $-1$ when the close is the Low of the day, to $+1$ when it's the High. For example, if the close is 3/4 the way up the range then CLV is +0.5.
The Accumulation/Distribution Index adds up volume multiplied by the CLV factor, i.e.

$$accdist = accdist_{prev} + (volume \times CLV)$$

The name "Accumulation/Distribution" comes from the fact that throughout the accumulation period buyers are in control and the price will be bid up through the day, or will make a recovery if sold down. In both scenario, it will usually be ending near the day's High than the Low. The opposite applies during distribution.

**b. Ease of Movement - EMV**

Ease of Movement (EMV) is an indicator developed by Richard Arms Jr., and used in technical analysis to monitor a security's price change relative to its volume. relate an asset's price change to its volume, and is valuable for determining the strength of a trend. In this way, strong positive values mean the price is increasing on low volume. Inversely, strong negative values mean the price is decreasing on low volume.

**c. Force Index - FI**

The Force Index (i.e. FI) is an indicator to exhibit how significant the actual selling or buying pressure is. High positive values signify there is a clear rising trend, and low values mean a clear downward trend.

The Force Index is computed by multiplying the difference between the last and previous closing prices by the volume of the security/commodity, providing a momentum scaled by the volume. The strength of the force is influenced by a greater price change or by a greater volume.

**d. On-Balance Volume - OBV**

On-Balance Volume (i.e. OBV) is a technical analysis indicator with the aim of describing price and volume of a stock price. OBV is based on a cumulative total volume.

$$OBV = OBV_{prev} + \begin{cases} volume & \text{if } close > close_{prev} \\ 0 & \text{if } close = close_{prev} \\ -volume & \text{if } close < close_{prev} \end{cases}$$

Because On-Balance Volume (OBV) is a cumulative result, the value of OBV relies mostly on the starting point of the computation.

## 4.4 Volatility Indicators

The cryptocurrency market is extremely volatile and it goes through low and high volatility cycles very rapidly. Some analysts firmly believe that observing the market movements during period of increased volatility can help to determine plausible future market trend.

A number of "Volatility indicators" are available on the platform; you can find their descriptions below:

**a. Average True Range - ATR**

Average True Range (ATR) is a volatility indicator that has originally been designed to analyse the Commodity Market by J. Welles Wilder Jr. The ATR provide the degree of price volatility. The ATR is characterized as N-day Smoothed Moving Average (SMMA) of the True Range values. The default time period recommended by Wilder is a 14-period Smoothed Moving Average. The range of one day of trading activity is Highest price – Lowest price. However, the True Range can extends to the prior day's closing in the case of today's price range to be incomplete.
high – low. The true range extends it to yesterday's closing price if it was outside of today's range.

$$\text{TR} = \max[(\text{high} - \text{low}), \text{abs}(\text{high} - \text{close}_{\text{prev}}), \text{abs}(\text{low} - \text{close}_{\text{prev}})]$$

The True Range is the largest figure out of three possible outcomes:

- It is either the latest available period's highest price minus the latest available period lowest price
- Or the Absolute value of the latest available period's highest price minus the prior day close price
- Or the Absolute value of the latest available period's lowest price minus the prior day close price

The Average True Range at T time is calculated as follow:

$$\underline{ATR_t = ATR_{t-1} \times (n-1) + TR_t}$$
$$n$$

An arithmetic mean formula is used to calculate the first value of the Average True Range:

$$ATR = \frac{1}{n}\sum_{i=1}^{n} TR_i$$

The thoughts around the ranges are to allow the analysts to understand whether there is an interest on the market from trader. While decreasing ranges would show a diminishing interest from the traders on the market, huge or increased ranges could mean that interest in the said product is there and traders should keep on placing buy and sell orders through the day.

**b. Bollinger Bands**

Bollinger Bands are a volatility indicator that have originally been designed by J. Bollinger in the 1980s. The Bollinger Bands aim to measure the Highness or Lowness of the price in comparison to the previous trade prices. The upper band shows high prices while the lower bands shows low prices.

Three elements define the Bollinger Bands:

- The first element is an N-period Moving Average (MA)
- Secondly, an upper band at K times with an N-period standard deviation above the moving average (MA + K$\sigma$)
- Lastly, a lower band at K times with an N-period standard deviation below the moving average (MA - K$\sigma$)

Moving Average is the standard for the Bollinger Bands calculation, but it is possible to use other kind of average calculations such as Exponential Moving Average that is also a relatively classic choice. The default values used for standard analyses are N=20 and K=2.

**c. The Donchian Channel**

The Donchian Channel is a volatility indicator that has originally been designed by R. Donchian. The purpose of the Donchian Channel is to visually illustrate on charts the volatility of a market price of a product. Two lines will be showing the highest and lowest prices. As long as the price is stable, the Donchian Channel will be relatively close. However, if the price is volatile and vary a lot, the Donchian Channel will be more spread. The initial use of the Donchian Channel was to create signal for long and short positions trading.

The Donchian Channel consist of the highest price and the lowest price across the previous N periods. The Donchian Channel is the space between the high and low lines.

**d. Keltner Channel**

The Keltner Channel is a volatility indicator that has originally been designed by C. W. Keltner in 1960. The Keltner Channel is a graphical indicator that shows a central Moving Average line supported by two additional Channel lines on top and under it. The traders usually consider the upper line as a bull market signal, whereas the lower line indicate a bearish market sentiment.

Keltner describes in its book that the central Moving Average line should be a 10-day Simple Moving Average of what he calls a typical price. The typical price is the average of the close, highest and lowest prices of each day.

$$typical\ price = \frac{high+low+close}{3}$$

The lines above and below are drawn a distance from that centre line, a distance which is the simple moving average of the past 10 days' trading ranges (i.e. range high to low on each day).

The trading strategy is to regard a close above the upper line as a strong bullish signal, or a close below the lower line as strong bearish sentiment.

## 4.5 Support and Resistance Indicators

Support and Resistance is a concept that the movement of the price of a security will tend to stop and reverse at certain predetermined price levels and should not break these two thresholds unless a specific event on the mar-

ket is taking place. The "Support and Resistance indicators" available on the CRYX platform are the following:

**a. Pivot Point**

A pivot point is a price level indicator that shows market movement. It is an average of three prices of the prior trading period: highest price, lowest price, close price. This concept is traditionally used in financial markets to estimate if during the follow period the price of a product is following a bullish or bearish trend. If the current price is over the prior day pivot point, traders usually consider that there is a bullish sentiment on the market, in the opposite case, if the current price is under the pivot point; market sentiment tends to be bearish. There are a number of different methodologies that can be used to calculate the pivot point P of a market. The most typical are as follow:

Arithmetic Average of the highest H, lowest L and closing C market prices of the prior day period:

$$P = (H + L + C) / 3.$$

- Alternative calculation including the opening price (i.e. O):

$$P = (O + H + L + C) / 4.$$

- Two variants emphasise on the closing C or opening O price, adding it up twice:

$P = (H + L + C + C) / 4$, or the current periods opening price, $P = (H + L + O + O) / 4$.

**b. Price Support and Resistance Levels**

Price supports and resistance levels are two price level indicators that have a similar role depending of the direction of the trend analyzed. These famous trading indicators may come from a number of market information and assumptions. Supports and resistances are linked to pivot point calculation. There are usually a certain number of levels above and below the pivot point that are deriving from the prior trading periods price movements. These levels are either subtracted from the pivot point to be support levels or added to the pivot point to be resistance levels.

The first and major support S1 and resistance R1 levels comes from the upper and lower halves of the previous trading range that is determined by trading activity below and above the pivot point.

The lower width of the previous trading range added to the pivot point will give the first level of resistance for analyzing up-side market. On the down-side, the upper width of the prior trading range under the pivot point will show the first level of support.

The support and resistance levels can be calculated by subtracting the prior trading price from the doubled pivot point value. Subtracting the prior day lowest price will return the resistance level, while subtracting the prior day highest price will show the support level.

$$R1 = P + (P - L) = 2\times P - L$$
$$S1 = P - (H - P) = 2\times P - H$$

Another important support S2 and resistance R2 levels are extension of the first support S1 and resistance R1 levels. To obtain these levels, the entire width of the previous trading range needs to either be added or subtracted from the pivot point.

$$R2 = P + (H - L)$$
$$S2 = P - (H - L)$$

The last set of support S3 and resistance R3 levels is calculated by adding or subtracting the doubled previous trading range from the pivot point. This will show a higher and lower set of support and resistance levels. In some rare cases, the previous trading range can be tripled to increase the support and resistance levels.

$$R3 = H + 2\times(P - L) = R1 + (H - L)$$
$$S3 = L - 2\times(H - P) = S1 - (H - L)$$

In all cases, the second, third and higher sets of levels will be placed symmetrically above and below the pivot point. That is not necessarily the case for the first support and resistance level.

## 4.6 Others

The following technical indicators are also available on the CRYX Platform:

**a. Coppock Curve**

The Coppock Curve, also called the Coppock indicator in some instances, is a technical indicator that that has originally been designed by E.S.C. Coppock and firstly published in 1962. The Coppock Curve was traditionally designed to analyse stock market on a long-term investment basis.
The Coppock Curve is calculated by summing up the prior 14-month rate of change and the 11-month rate of change, this sub-total being then smooth by a 10-period Weighted Moving Average as show by the following formula:

$$Coppock = WMA[10]\ of\ (ROC[14] + ROC[11]).$$

**b. Ulcer Index**

The Ulcer Index is a technical indicator that that has originally been designed by P. Martin and B. McCann and firstly published in 1989. The Ulcer Index was traditionally designed to measure stock market risk and downward trend volatility.
The Ulcer Index calculation is done on N numbers of prior days. The calculation is moving forward from the oldest closing price to the newest and is retaining the highest of the two. Any new closing price that is under the retained price will be labelled as a retracement R and shown as a percentage.

$$R_i = 100 \times \frac{price_i - maxprice}{maxprice}$$

One example to illustrate how a Retracement R is effectively calculated: For a highest retained price of $10.00, if the newest price is $9.00 then we have a retracement of -10%.

The Ulcer index is calculated by a Quadratic Mean, also called a Root Mean Square, of the retracement values R.

$$Ulcer = \sqrt{\frac{R_1^2 + R_2^2 + \cdots R_N^2}{N}}$$

The Ulcer Index will always be positive whether the retracement R values are negative or not.

## 4.7 Upcoming: Breadth Indicators

Market breadth is a technical analysis that attempts to gauge the direction of the overall market by analyzing the number of companies advancing relative to the number declining.

# 5. Online Platform

## 5.1 Alpha Platform

The Alpha Platform will provide access to all the necessary information about the CRYX Project and its Token. Our white paper is available as well as information about the team and our advancement in the project.

The first aim of our project being the implementation of Cryptocurrency Indexes, platform Alpha will provide an access to our Indexes under the form of line graphs and performance returns tables. By selecting the weighting methodology and the number of constituents, users will have an overview of the requested market.

Our choice is to initially offer three ranges of indexes, each having different calculation methods (i.e. Cap-Weighted, Equal-Weighted, EXponential Flattening - FLEX) with a fixed number of cryptocurrencies for each index. After thoroughly analyzing the current market space, we decided the most relevant numbers of index constituents would be 5, 10, 25, 50 and 100.

Testing our Alpha platform and our range of indexes will be free, however we will display only a limited number of data initially and focus on developing our Beta platform that shall contain more information.

The Cryx Backtesting Tool has already been launch on the Alpha Platform. It is currently in a Minimum Viable Product state and will allow you to experience 15 technical indicators over more than 1000 cryptocurrencies with historical trade volumes and prices also available.

## 5.2 Beta Platform

The Beta Platform will provide additional services and is targeted to be launched before the end of Q2 2018:

- Enhancing our ranges of indexes with continual development to fulfill user needs. Allowing more data to be reviewed and manipulated for better comparison purposes. We are also willing to produce "customized indexes" for users who have very particular needs that cannot be satisfied with our standard offering at any point in time.

- Development of a backtesting tool allowing users to backtest performance of their cryptocurrency

strategies. Users will also be able to use some technical indicators and set various parameters to compare how well their investment strategy are performing.

- We aim to provide a large range of analysis under different sections: "Fundamental Analysis" of tokens and cryptocurrency projects, "Technical and Graphical Analysis" of cryptocurrencies and tokens prices, "Quantitative Analysis" of price movement behaviours.

- A dynamic area will be launched to allow the community to discuss and debate on cryptocurrency-related topic. Every topic can be linked to a specific kind of analysis. Users will be able to post their own reviews, analyses and comments easily.

- Development of a Machine Learning tool applied for Price Forecasting The Beta platform will also have a free-to-test access for all the interested users, nevertheless a premium subscription (buy via CRYX Token) will be necessary in the future to enable further functionalities to be unlocked:
  - Receive Index data under an exploitable format, with selected granularity
  - Receive the constituent list of an index


# 6. Why the Ethereum Blockchain?



The CRYX Token will be launched on one of the most cutting edge and popular blockchain network. Ethereum is the new generation of blockchain protocol with its advanced smart contracts capability. This is a secure, transparent, automated and uncensored platform which is available worldwide. It completely removes counter-party risk and unnecessary intermediaries.

Ethereum has become very popular among the blockchain industry, especially the past year. A large number of institutions, organisations and mostly brand new start-ups have decided to link their fate with the platform. This contributes in increasing visibility of the blockchain technology on the market as well as showing strong interested in the potential it has for the future.

Given our main products will be based on the cryptocurrency market and following the evolution of the blockchain-based economy, we thought it was a great opportunity for us to start our company by following the current momentum around token reward based crowdfunding campaign and launch our own Token crowdsale. This became the obvious choice for the whole team as soon as we asked ourselves this question.


# 7. Token Crowdsale Details

## 7.1 Token Crowdsale

### 7.1.1 Pre-Sale

Start Date:

April 9, 2018 at 12:01AM GMT

End Date:

April 16, 2018 at 11:59PM GMT

### 7.1.2 Token Crowdsale

Start Date:

TBD

End Date:

TBD

### 7.1.3 Token

CCX Tokens issued:

40 000 000 – 40 Million

Token Exchange Rate:

1 ETH = 1,000 CCX

## 7.2 Discount Rate for Early Supporters

| | | |
|---|---|---|
| Pre-Sale | 50% | 1 ETH = 1,500 CCX |
| First Week | 30% | 1 ETH = 1,300 CCX |
| Second Week | 20% | 1 ETH = 1,200 CCX |
| Third Week | 10% | 1 ETH = 1,100 CCX |
| Last Week | 0% | 1 ETH = 1,000 CCX |

## 7.3 Minimum Amount to Participate

Participants are required to contribute a minimum amount of 0.01 ETH to participate.

## 7.4 Advisory Board Token Reserve

In order to reward our past and future advisors and contributors, a segregated wallet will be created to hold 2% of the total amount of CCX issued. This amount to a total of 800,000 tokens that will not be sold during the token crowdsale nor be burned after its completion.

## 7.5 Burn Policy

The remaining pool of CCX tokens that has been issued but not distributed to supporters nor transferred to the segregated wallet for rewarding advisors as described previously (see 5.4) will be burned upon ending of the token crowdsale. This means that the remaining supply will be effectively destroyed and not kept by any parties upon completion of the token crowdsale.

## 7.6 US Participation

The Securities and Exchange Commission recently made a filing that most coins need to be registered as a commodity to run an ICO for US citizens. We strongly believe the CCX should be following the exception rule for when the token / coin has a purpose as part of a platform or system but given the loose legislation still surrounding this topic we'd rather exclude US participation in the Token crowdsale.

## 7.7 Refunds

There will be no refunds once the tokens have been distributed. The structure of the token distribution is meant to be a transactional event that is irreversible once done.

# 8. Roadmap and Operations

## 8.1 The CRYX Project Roadmap

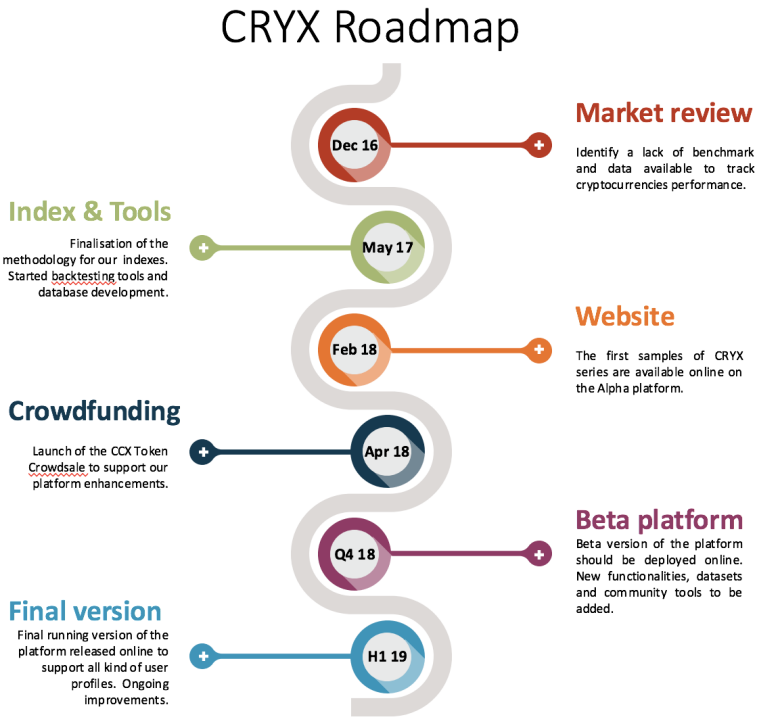



Figure 8.1: The Roadmap of the CRYX Project

## 8.2 Asset Allocation

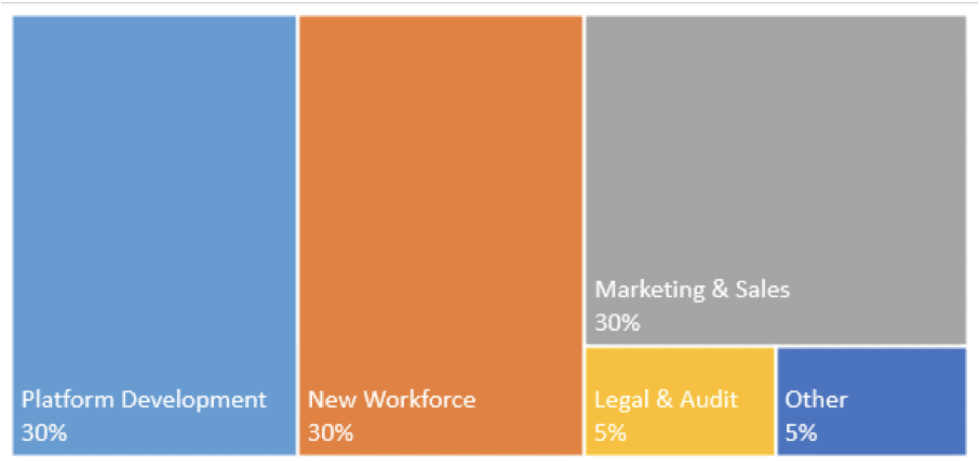



Figure 8.2: Asset Allocation

## 8.3 Legal and Audit

We are planning to hire legal advisors to ensure our service offering do not go against any law and allow us to run our business as efficiently as possible within the legislations where our activities will be taking place. It is really important for us that users have a clear understanding of the responsibilities and rights of all the parties which are involved while using our services. We also want to point out that cryptocurrencies are still fairly unregulated and we wish to keep a legal contingency fund to prepare for any unforeseen future events.
It seems important as well to focus on the quality and process controls. We shall reach out to external auditors to enhance our internal control and clarify the requirements on certain business areas.

## 8.4 Platform Development

The main focus will be toward our online platform. Resources will be allocated to improve the infrastructure and the maintenance costs, as much as any further costs which would enhance the performance and quality of the services offered. We will endeavour to develop, test and upgrade our online platform as much as possible and frequently as required in order to meet user's needs. The first steps will be to implement all our Indexes Data, focus on the community section and release the back testing toolkit. We will welcome any advises and criticisms as long as it helps us provide the best services on the market to our community. This will be the most visible part of our business and it will show the hard work and efforts we put together to build the tool we have been planning as a team for many months.

## 8.5 Employees

As our business grows, we shall need to hire new talents to oversee particular areas of our activities. We want to ensure the best quality of services to our users and we believe that new members will be able to bring new ideas, new skills and create more possibilities for the future. Future staff members will primarily consist of information technology professionals that will cover various business areas.

## 8.6 Business Development and Marketing

Alongside our long-term platform development, we believe it is a necessity for us to devote part of our early activity to making our project and services known to the public. It is essential for us to build a strong

community to support our effort and therefore we will spend a subsequent amount of time contacting pertinent cryptocurrency stakeholders and forming relationships with other partners to ascertain our brand and products visibility.

# 9. Legal Considerations

Be aware that this White Paper is for information only. CRYX Ltd “The Company” does not guarantee the contents described within this document and all the actions and items that are stated to be taken place in a near future are solely to be put in place on a best effort basis, they may or may not happen in due time or at all. The CRYX Team will obviously do its best attain its objectives and deliver the amazing products and tools we are explaining through this document, but it is fair to say that the success of this project is heavily dependent on external parties and stakeholders.

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The company and the CRYX Team will endeavor to abide by the laws set worth in its business environment and the countries where they will operate. Our Legal entity whose purpose is to offer information services is already registered with the required regulatory institutions. We will gladly collaborate and response to any inquiries from any regulatory entities would such requests be addressed to us in the future.

## 9.1 TOKEN Legal Observations

CCX tokens are ERC-20 tokens developed on the Ethereum blockchain. CCX are designed to be used within the CRYX Platform upon its launch and may or may not give users premium accesses to services and data. CCX tokens are not securities. CCX tokens are not for speculative investment. CCX tokens are non-refundable. CCX tokens are not considered as any participations of any type in the company and these tokens hold no rights in the said company. No promises of future value or performance are or will be made with respect to CCX tokens, including but not limited to no promise of inherent value, no promise of continuing payments, no promise of future use, and no guarantee that CCX tokens will hold any specific value. CCX tokens are sold as functional utility tokens which could considered as vouchers usable on the CRYX Platform in the event of completion and launch of the said online platform. All the proceeds received by the company shall be spent as deemed necessary without any restrictive conditions.

## 9.2 Data Provider Legal Concerns

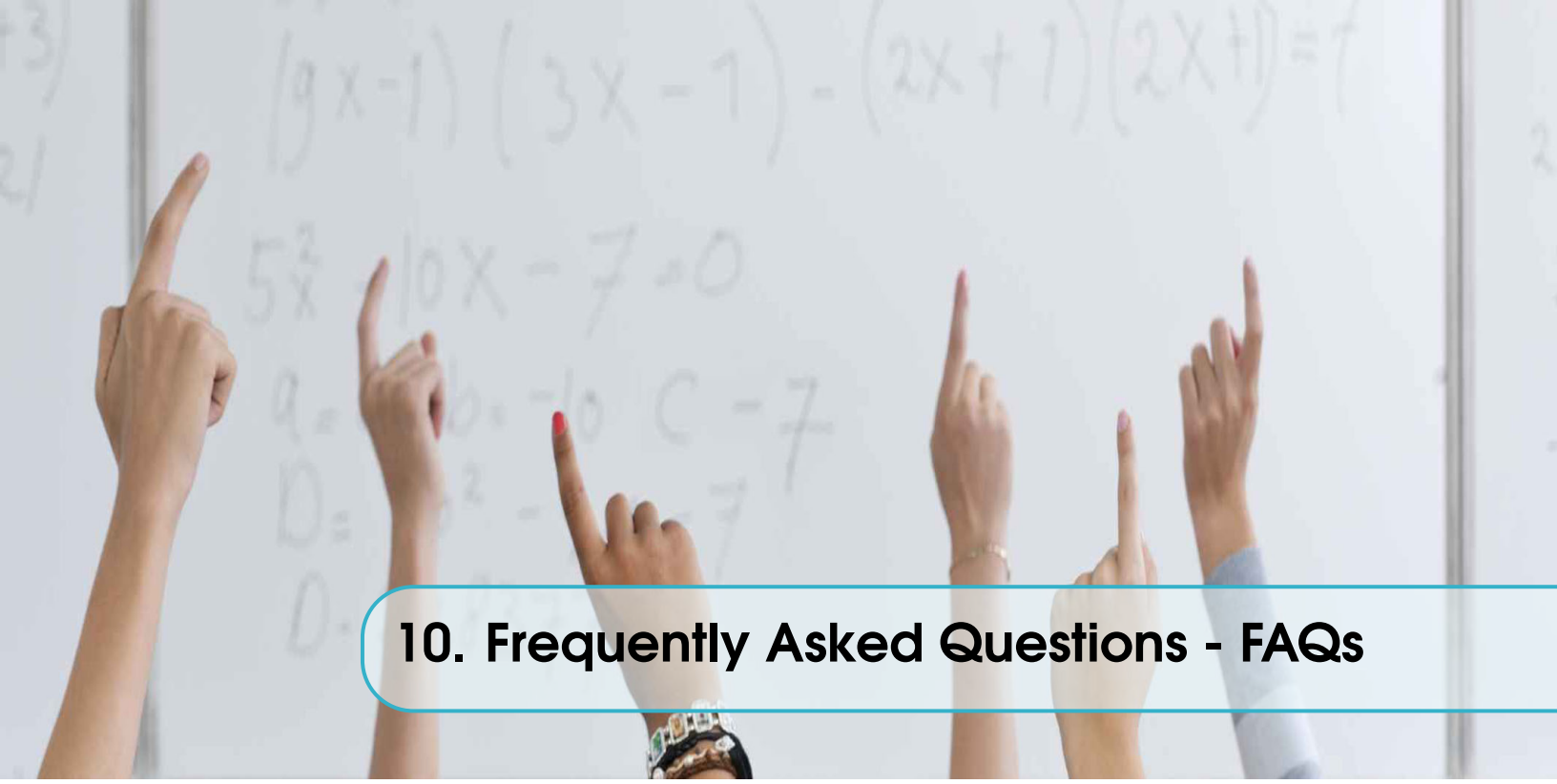
The Index data and all kind of data readily available on the CRYX website and web platform will be defined as “Data”. The Data is for your personal and informational purposes only, and the user of the information contained in the Data assumes the entire risk of any use made of the Data. You understand and agree that the Data is provided "as is" and CRYX Ltd, “the company” does not warrant the accuracy, completeness, non-infringement, originality, timeliness or any other characteristic of the Data. The company cannot be held liable for any damages resulting from the use of or the inability to use the website or its content and links. The company cannot be held responsible for the accessibility of this website in certain countries and regions or for the compliance of the information or materials provided here with the laws or customs in countries outside the United Kingdom. You access this information at your own risk and are thus personally and fully responsible for complying with the locally applicable laws.

The Data is not an offer or recommendation to buy or sell or a solicitation of an offer to buy or sell any cryptocurrencies or to participate in any particular trading strategy. Further, none of the Data is intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such. Reproduction, redistribution or any other form of copying or transmission of the Data without the company’s prior written consent is strictly prohibited. Without limiting the generality of the foregoing, the Data and other company’s intellectual property you access via the website and web platform may not be used as a basis for any financial instruments or products (including, without limitation, passively managed funds and index-linked derivative securities), or used to verify or correct data in any other compilation of data or index, or used to create any other data or index (custom or otherwise), without the company’s prior written permission.

In no event shall any of the company, its affiliates, any of its or their direct or indirect information providers nor any other third party involved in, or related to, compiling, computing or creating any of the Data Information (collectively, the "Company Parties") have any liability to any person or entity for any damages, whether direct, indirect, special, incidental, punitive, consequential (including, without limitation, loss of use, lost profits or revenues or any other economic loss) arising in any manner out of your use or inability to use any of the Data contained on the CRYX website, even if such party might have anticipated, or was advised or notified of, the possibility of such damages.

Upon use of the CRYX website and platform, you agree to indemnify, defend and hold harmless the company Parties from and against any claims, losses, damages, liabilities, costs and expenses, including, without limitation, reasonable attorneys’ and experts, fees and costs, as incurred, arising in any manner out of your use of, or inability to use, any Data contained on the website.

By using, reviewing or obtaining the Data, you acknowledge that (i) Data and all components thereof constitute copyrighted, database righted, trade secret and/or proprietary information of substantial value to the company, (ii) that you receive no proprietary rights whatsoever in or to the Data, and (iii) that title and ownership rights in and to the Data and all the rights therein and legal protections with respect thereto remain exclusively with the company. You shall not, and shall not assist any third party to, assert any rights in the Data or any component thereof or challenge the company’s rights therein.



# 10. Frequently Asked Questions - FAQs

**1) What Is The CCX Token?**

A cryptocurrency that has been privately issued on the Ethereum blockchain.

**2) What Are The CCX Tokens Used For ?**

To unlock features on our soon coming Data Analytics platform to allow users to manipulate data, to test investment scenari and to forecast prices.

**3) How Do CCX Tokens Work ?**

CCX Tokens will be available on pre-sale on the 9th of April 2018 12:01AM GMT – unless the total supply has been distributed earlier during the pre-sale or the actual token crowdsale, then the crowdsale would end at this specific time. People will give us Ethereum and we will give them CCX Tokens in exchange.

Fund raised through this collective effort will be invested in the platform and the team to develop our final product highlighted on our whitepaper.

**4) Can I Sell My CCX Tokens ?**

CCX Token holders may choose to sell their coins on the market at any time they wish.

**5) Will People Trade CCX Tokens ?**

It is very likely that people will trade their CCX Tokens.
While a certain quantity of CCX Tokens will be spent on our platform by users, anyone is free to buy and sell CCX Tokens on markets at whatever price is available without our input or consent.

**6) What Happens If You Don't Sell All The Coins During the Token Crowdsale ?**

Any coins that are left unsold will be immediately and publicly burned when the crowdfunding period closes.

**7) Can I Claim a Refund ?**

Unfortunately the block chain is designed as a one-way transaction model. Once you participate on the Tokens crowdsale you will receive CCX Tokens for your contribution paid in Ethereum. There will be no refund.

**8) Can You Actually Make Use Of All The Money You Raise ?**

Yes. The service and quality level will be more than likely linked to how much we raise. We will also focus on the community and advertising for people to join us, and this will be easier as we raise more funds. We have currently defined a flexible business model.

CRYX

# Find CRYX on:

 *info@cryx.io*

 *github.com/CRYXindex/cryx*

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Last Revision: February 18th, 2018.



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