

# Digital Currency Index: The White Paper



## ASSET BACKED

Own Tangible Digital Currency Assets all from a Single Coin



## LIQUIDITY

Enjoy Liquidity from a Market Exchange Listed Coin



## DIVERSIFICATION

Own the Top 30 Digital Currencies + Up and Coming Projects in a Single Coin



## DIVIDENDS

Receive Annual Dividends from your Index Holdings

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# 1 Overview

## 1.1 Our Mission

The Digital Currency Index (DCI) Coin gives you direct access to the Top 30 Digital Currencies evaluated by their market cap and project scope to ensure you're diversified for long term market sustainability.

## 1.2 Platform

The DCI currency, XIC, was developed on the Ethereum platform and is not supported by an independent blockchain. Transactions and events can be tracked via EtherScan.

# 2 The Index Portfolio

## 2.1 Purpose and Overview

A key purpose of the DCI is the diversification of a very volatile cryptocurrency market. This allows for an investment in the entire cryptocurrency space without the risk of betting on a single coin and the hassle of holding coins from different exchanges or in different wallets. There are many coins available and some are very valuable investment vehicles. However, others are highly volatile and, frankly, others are worthless. The goal of DCI is to manage an index fund of coins that is the weighted average of the top 30 coins.

While the qualifications of a top performing coin are somewhat subjective, the overall goal is to minimize risk and maximize returns. The key to that is creating a weighted average of many un-correlated or negatively correlated coins with the highest possible expected return including the possibility of replacing coins within the index. Unfortunately, many coins are highly correlated, very volatile, and some have a non-zero probability of spontaneous failure. There are competing metrics for which one can optimize a portfolio towards; specifically maximizing expected return versus minimizing volatility. The goal of the DCI is to maximize the Sharpe Ratio, which is a ratio of expected portfolio returns over the portfolio standard deviation.

The selection process involves the simulation of millions of possible future single-year market prices, based on the historic volatility and correlation of returns using the last 1 year of data. A penalty is applied to the newest coins that have less historical data and a higher chance of spontaneous failure using a proprietary scoring function based on the Lindy Effect which is explained in the following paragraphs.

Within this simulation, a report of the maximum expected draw-down, maximum days of loss, expected return, expected 95th percentile return/loss, and the expected Sharpe Ratio is generated. More importantly, an optimization process, using a genetic algorithm, is utilized to develop an optimal portfolio. After each simulation, the portfolio is rebalanced by up-weighting top performing assets and down-weighting poor performing assets until an optimal portfolio of assets is created across all future scenarios in terms of both minimizing volatility and maximizing return.

This is neither a coin to day trade nor a coin to buy and hold (not HODL). The hard work of diversifying the portfolio for maximum value over the next 1 year holding period has already been completed. Additionally, the portfolio is periodically reweighted to move new top performers in and move bottom performers out. If any asset that is expected to fail, due to a hack, fraud, or any other specific reason, said asset would be immediately removed from the portfolio to be replaced with the next best performing coin.

The Lindy Effect states simply that the future life expectancy, also referred to as the probability of failure, is proportional to both the health and existing longevity of the entity in question. This is also part of the Doomsday argument. Put simply, fads fade quickly and old things tend to remain. For the purposes of DCI, coins that have been around for a long time and have high market share have a near zero probability of spontaneous failure, while newer coins with a lower volume have a higher probability of spontaneously becoming worthless.

Here, the probability of failing on a single day is defined as a function of health (market cap), longevity, percent of coins in circulation, and sentiment.

## 2.2 Rebalancing the Fund

In a volatile market, rebalancing is particularly important to see gains greater than the market is capable of providing through a pure hold strategy. It is important to note that this is not an arbitrary buy and sell, but a periodic and systematic movement between assets within a portfolio.

Consider holding a pair of coins/assets across 3 periods where you initially have 1 unit of each. If the price of a more volatile asset (A) drops in period 2, and we hold instead of rebalancing, then when the value of asset A returns to the original price in period 3, then we are indifferent, seeing neither gain nor loss.

	Asset A (\$)	Asset B (\$)	A Holdings (#)	B Holdings (#)	Total Value (\$)
<b>Period 1</b>	100	100	1	1	200
<b>Period 2</b>	50	100	1	1	150
<b>Hold</b>	50	100	1	1	150
<b>Period 3</b>	100	100	1	1	200

Table 1

If, however, we choose to rebalance at period two towards the more volatile asset, and then the price returns to its original value, then we can realize gains above a pure hold strategy.

	Asset A (\$)	Asset B (\$)	A Holdings (#)	B Holdings (#)	Total Value (\$)
<b>Period 1</b>	100	100	1	1	200
<b>Period 2</b>	50	100	1	1	150
<b>Rebalance</b>	50	100	1.50	.75	150
<b>Period 3</b>	100	100	1.50	.75	225

Table 2

The logic is similar if the price moves up and comes back down. If we do nothing, the value at period 3 shows no change.

	<b>Asset A (\$)</b>	<b>Asset B (\$)</b>	<b>A Holdings (#)</b>	<b>B Holdings (#)</b>	<b>Total Value (\$)</b>
<b>Period 1</b>	100	100	1	1	200
<b>Period 2</b>	150	100	1	1	250
<b>Hold</b>	150	100	1	1	250
<b>Period 3</b>	100	100	1	1	200

Table 3

However, if we rebalance by moving away from the more volatile asset and towards the more stable, we see an increase in valuation.

	<b>Asset A (\$)</b>	<b>Asset B (\$)</b>	<b>A Holdings (#)</b>	<b>B Holdings (#)</b>	<b>Total Value (\$)</b>
<b>Period 1</b>	100	100	1	1	200
<b>Period 2</b>	150	100	1	1	250
<b>Rebalance</b>	150	100	.50	1.75	250
<b>Period 3</b>	100	100	.50	1.75	225

Table 4

This type of rebalancing works in a generally stable and increasing market. However, if certain assets are declining due to collapse, then rebalancing down can lead to higher losses. Even though this may be discouraging, the expected value by rebalancing is consistently higher. There is a benefit of rebalancing through simulation where we can account for the risk of the collapse of a single asset.

Only two things should trigger a rebalancing, information and schedule. Certainly, specific information about the likely failure of a coin should indicate a rebalancing towards a more stable asset. Rebalancing of the portfolio is scheduled to occur every quarter. Additionally, the overall index balance will be audited and adjusted annually.

## 2.3 Prerequisites for Candidate Coins

The initial portfolio was chosen based on the Top 30 coins defined by market cap in July 2017. Any coins that might replace coins currently in the index must have been available on exchanges for at least six months and must have been in the top 100 coins defined by market cap for at least 90 consecutive days. Each potential coin is required to have an active and viable public project scope.

# 3 XIC: The Token

## 3.1 Overview

The Index Coin (XIC) is the token that represents ownership of the underlying assets that make up the index. The total supply of XIC will be limited to 200,000,000 XIC and XIC

is produced through a mint function available in the token contract. It utilizes 8 decimal precision due to the index's long term growth potential. Even as the index number grows, new holders of the index coin should be welcomed rather than be forced out due to large trading costs. Its value is derived from the underlying cryptocurrency assets and is expected to fluctuate with the market values of the assets. The index number, and the index coin value, is supposed to be an indicator of the status of the cryptocurrency market based on the performance of the top 30 coins at a given time. As mentioned in the sections describing the index, the member coins are subject to vary over time.

## 3.2 The Rules

### 3.2.1 Issuance

Participants of the crowdsale will not be able to immediately be able to trade their XIC. The DCI team is scheduled to release the address for the XIC token contract on December 31, 2017 in a private facebook group called Digital Currency Index - Presale ICO. Participants will join where they can interact with the community or merely wait for the release of the contract address. The token address will only be published here so be sure to join if you wish to collect your XIC. Until that time, participants will only be able to check their token balance on our website by entering their wallet address on the DCI website for transaction verification.

### 3.2.2 Trading

Holders of XIC cannot trade more tokens than they have. Events are published on EtherScan for holders' verification of transaction completion. A ledger of balances and associated addresses are kept for the purposes of dividend distribution which will be discussed in later sections.

### 3.2.3 Mining and New Coin Production

No one can mine new XIC and no new coins will be created after the 200,000,000 cap has been reached.

## 3.3 Security

Many of the sensitive components of the source code are password and address protected. For clarification, an attacker would need a password and the address that deployed the contract in order to access various functions in the smart contract such as the mint. The ability to change the password access to the contract also exists for routine security updates or if the team feels threatened at any time. In order to ensure that our token provides the most value to the participants, the XIC token address will not be distributed until the end of the crowdsale. The DCI team is taking every possible precaution in order to maintain the integrity of the coin, the index, and the participants in our crowdsale.

## 4 Initial Coin Offering

### 4.1 Block Based Offering

The DCI ICO is a capped offering and there is no time limit for participation. 200,000,000 XIC will be issued in a series of blocks. The total supply available to participants is 140,000,000 XIC with an additional 20,000,000 XIC available to the DCI team. The final 40,000,000 XIC would be held for dividend distribution in the future. Once the 160,000,000 cap has been reached, no one will be able to send any ETH to the contract address. If an individual attempts to send ETH so that the cap is broken, that participant will be refunded the extra ETH and receive the remaining XIC allocated.

In addition to this being a capped crowdsale, tokens will be offered in blocks. These blocks have their own associated exchange rates of USD to XIC. Naturally, USD is much less volatile than ETH and allows for participants to receive the same amount of product for approximately the same cost. For example, if 1 XIC costs 1 ETH throughout the presale, then the USD amount per coin changes drastically. If Alice buys 1 XIC when 1 ETH is equivalent to \$300 and Bob buys 1 XIC when 1 ETH is equivalent to \$290, Bob saves \$10 in the total transaction. Much like the purpose of the index, this process is meant to eliminate volatility and provide the same value to participants in each respective block.

In order to achieve such a system, our contract retrieves the exchange rate of USD to ETH, denoted by  $x$  in Eq (1), when a participant sends ETH to the contract address. This is then used to determine the instantaneous exchange rate between ETH and XIC. The DCI team has defined what the cost of 1 XIC with respect to USD. This is defined by  $y$  in Eq (1). Units are presented in parentheses.

$$\frac{x}{1} \left( \frac{\text{USD}}{\text{ETH}} \right) = \frac{y}{1} \left( \frac{\text{USD}}{\text{XIC}} \right) \quad (1)$$

Through dimensional analysis, the instantaneous exchange rate between ETH and XIC is defined by the quotient of the cost defined by the DCI team and the exchange rate between ETH and USD. This relationship can be seen in Eq (2).

$$1(\text{XIC}) = \frac{y}{x} (\text{ETH}) \quad (2)$$

Blocks and exchange rates will remain the same until the amount of XIC allocated to said block is depleted. Unlike the global cap of the sale, if a participant sends ETH and should receive more XIC than the current block has left, the participant will receive all of the XIC at the exchange rate associated with the block with which the transaction occurred in.

Events are utilized in the smart contract that allows participants to confirm the completion of their transaction and to let users know that the funding goal has been reached which results in the closing of the sale. As previously mentioned, participants are not able to contribute to the sale once the goal has been reached or the contract has been disabled.

## 4.2 The Rules

DCI requires a minimum contribution of 1 Ether in order to participate in the crowdsale. The DCI team is not allowed to contribute during the ICO with the purpose of inflating the number of tokens issued or increase the teams share of the total supply of tokens. If the contract is disabled either because the funding goal was reached or by a remote contract, the user attempting to participate will be automatically refunded the ETH sent to the contract.

## 4.3 What Happens to the Ether Sent to the Contract Address

After sending ETH to the ICO contract address, XIC will be transferred to your account. As aforementioned, you will not have access to your XIC until December 31, 2017. Upon completion of the transaction, the ETH sent to the contract is transferred to the address of the DCI team. The ETH will then be transferred manually to a hardware wallet that will remain disconnected from any network except to periodically transfer contributed ETH to the wallet. After the completion of the ICO, the ETH will be used to purchase the portfolio member coins and these assets will again be stored on hardware wallets.

## 4.4 Goals

Naturally, the goal of the DCI team is to distribute all 200,000,000 XIC. However, should the ICO raise less than \$300,000 by the time the token is scheduled to be issued, refunds will be provided to all of those who participated. This refund protocol will not be automated as your ETH will be stored offline. The DCI team will do their best to remain active about relaying important information related to important topics, such as refunds, with the participants. To stay up to date, follow the associated social media accounts, subreddit, and the DCI website.

## 4.5 Security

Similar to the XIC token contract, many of the functions in the crowdsale contract are password and address protected. This contract also includes the ability for the issuer to change the password associated with these functions. Additionally, DCI has the ability to remotely disable or self destruct the crowdsale contract. While there is no deadline contingent on time of the sale and the contract automatically disables once the funding goal is reached, these precautions are necessary if the DCI team feels threatened in any way. The DCI team will do its best to communicate openly with the participants and potential participants regarding the status of the contract. If the contract is remotely self destructed, any ETH sent to the contract will be lost forever. Make sure you consult our website, subreddit, or social media accounts before deciding to participate to ascertain the status of the sale. These measures are in place to protect the honest participants of the crowdsale. If the crowdsale is prematurely terminated, refunds will be given to all of the participants of the sale and the address of the XIC token contract will not be distributed.

## 5 Dividends

### 5.1 The Rules

Dividends, valued in XIC, can only be distributed by and the amount can only be determined by the DCI team. In order to protect against high inflation rates, the distribution of dividends is not on an automated schedule. These are distributed through a separate contract that has access to the ledgers in the token contract. The DCI plans to distribute dividends on a yearly schedule but reserves the right to not issue dividends to holders in certain circumstances.

### 5.2 Distribution

Once the amount of XIC to be distributed is determined, the amount received for each held XIC,  $d$ , is given by the ratio of the total amount of XIC to be distributed,  $X$ , to the total supply of XIC before the distribution of dividends,  $T$ .

$$d = \frac{X}{T} \quad (3)$$

Each user is given an amount of XIC,  $n$ , according to the product of  $d$  and the balance of the holder,  $b$ .

$$n = d * b \quad (4)$$

Expect  $d$  to be  $\ll 1$  XIC per held XIC in each release.

## 6 Team



**Roger Bryan - CEO**

Roger Bryan was a Pre-IPO investor in Hubspot and GoDaddy. He's started and sold two digital commerce businesses. He is also the best selling author of The Data Driven Marketing Agency. He brings his 20 years of experience in managing and directing digital companies to the team. He's been an investor in digital currencies since 2013.



### **Ariella Yager - COO**

Ariella is a serial entrepreneur with vast experience in bringing new ventures to market. Her expertise includes business operations, launch strategy, and team management. Ariella has her Bachelor's in Entrepreneurship and has been working in the tech space for over three years.



### **Michael Stansky - CDO**

Michael Stansky is a statistician with extensive experience across many different industries. In addition to his work here, he is a Manager of Market Analysis and Price Forecasting at a Fortune 500 utility company where he develops fundamental models used in commodity price and volatility forecasting. He holds a bachelor's degree in Theoretical Mathematics from Kent State University and a master's degree in Statistics from the University of Akron where he currently teaches Advanced Analytics.

**Brian Andrews - CTO**

Brian obtained his BA in Physics from Kenyon College and is currently pursuing his MS in Physics and Entrepreneurship at Case Western Reserve University. His expertise lies in numerical analysis, programming, data structures, and big data both within the scientific community and the startup space.

**Abigail Radcliffe - CMO**

Abby has an MBA from Case Western Reserve University with extensive experience in business strategy and development in a variety of industries. Her expertise lies in engaging with online communities and high level marketing strategies within the startup space.

## 7 Roadmap

<b>July</b>	Publish Index
<b>August</b>	Presale
<b>September</b>	Presale First ICO Block
<b>October</b>	ICO Quarterly Rebalance
<b>November</b>	Publish Portfolio Holdings List XIC on Exchanges
<b>December</b>	Quarterly Rebalance Coin Issue
<b>April 2018</b>	Quarterly Rebalance
<b>July 2018</b>	Annual Rebalance Dividend Disbursement

Table 5: Plan for XIC through July 2018