Reality Shares Nasdaq Blockchain Economy Index
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Introduction

This document summarizes the methodology and rules used to construct, calculate, rebalance and maintain the Reality Shares Nasdaq Blockchain Economy Index (the “Index”). The Index was created through a partnership between Reality Shares, Inc. (“Reality Shares”) and Nasdaq, Inc. (“Nasdaq”) and constitutes the joint research, analysis and investigation of both groups on the emerging development of blockchain technology. The Index is designed to measure the returns of companies that are committing material resources to developing, researching, supporting, innovating or utilizing blockchain technology for their proprietary use or for use by others.

Index Methodology

Eligibility Criteria and Index Construction

Potential constituents satisfying the following criteria are eligible for inclusion in the Index. The final constituents are selected, and the Index is constructed, using a rules-based, five-step process.

Step one – Initial Index Universe Selection

The universe of publicly-traded potential Index constituents are selected from across the globe and compiled by the Reality Shares Index Committee (the “Index Committee”) and Nasdaq based on multiple sources, including industry associations, journal posts, data searches, news articles, filings (including for patents), etc. This universe is generated from third-party data vendors to ensure good standing, data transparency, and that all potential constituents are related to blockchain.

Step two – Apply Tradability Criteria

Potential Index constituents must meet the following tradability requirements.

- Minimum market capitalization of USD 200 million.
- Minimum 6-month average daily volume of greater than USD 1 million.
- Must be listed on a regulated stock exchange in the form of shares tradable for foreign investors without restrictions.¹

Step three – Calculation of Blockchain Score™

A Reality Shares Blockchain Score is assigned to each potential Index constituent. The Blockchain Score is determined based on the following seven factors:

¹ The list of eligible exchanges is maintained and can be revised by the Index Committee. Any such revisions to the list of eligible exchanges shall be effective the next occurring reconstitution date.
Role in Blockchain Ecosystem – Potential constituents are awarded scores commensurate with their level of active effort in the blockchain economy, categorized as one of the following: Investor; Adopter; Advisor; Supplier; and Developer.

Blockchain Product Stage – Potential constituents are assigned scores based on their stage of blockchain product development or utilization, categorized as one of the following: Planning stage; Testing stage; and Growth stage.

Blockchain Economic Impact – Potential constituents are assigned scores based on the expected economic impact of their blockchain utilization/involvement, categorized as one of the following: Cost reduction; Revenue maximization; and Improved productivity.

Blockchain Institute Membership – Potential constituents are assigned scores based on membership in blockchain institutes and consortiums (including Hyperledger, R3, and the Enterprise Ethereum Alliance).

Research & Development Expenditure – Potential constituents are assigned scores based on the level of R&D expenditure as a percentage of total revenue.

Filings – Potential constituents are assigned scores based on the number of public filings and announcements made in reference to blockchain technology.

Innovations – Potential constituents are assigned scores based on their level of blockchain innovation, including the number of patent applications related to blockchain development.

Factor component scores are assigned based on Index methodology rules that stipulate a maximum value for each factor, and weight each factor based on its relative importance to the other factors. The Blockchain Score for a potential constituent is the weighted sum of the individual factor scores.
**Step four – Final Index Constituent Selection Based on the Blockchain Score**

The final Index constituents are those with a **Blockchain Score >= 50** as of the evaluation date. (Refer to the section titled “Number of Constituents” below for more details on the minimum and maximum number of Index constituents.)

**Step five – Calculation of Indicative Weights Using the Blockchain Score**

Indicative starting weights on the reconstitution dates are calculated using the **Blockchain Score** as follows:

\[W_i = \frac{B_i}{\sum_{i=1}^{n} B_i}\]

\[W_i = \text{Weighting of constituent } i\]

\[n = \text{Number of constituents}\]

\[B_i = \text{Blockchain Score of constituent } i\]

The sum of weights be 100%.

\[\sum_{i=1}^{n} W_i = 1\]

**Weighting Limits**

No single constituent can represent more than 15% of the total weight of the Index. Any excess weighting will be redistributed amongst the remaining Index constituents. The five most heavily weighted constituents cannot exceed 50% of the total weight of the Index.

**Number of Constituents**

The number of constituents in the Index is variable and dependent on the level of filtering resulting from the selection process. However, the Index will have no less than 50 and no more than 100 constituents. If more than 100 constituents meet the selection criteria, the top 100 (based on **Blockchain Score**) are selected for inclusion in the Index.

**Rebalancing and Reconstitution Frequency**

New Index constituents are selected during semiannual reconstitution in March and September.

During the March reconstitution:
• If new constituents are added to the Index per the selection process, the underlying portfolio weights are rebalanced for all constituents in the Index.

• If no new constituents are added to the Index, the underlying portfolio weights are not adjusted and the Index is not rebalanced.

During the September reconstitution:

• If new constituents are added to the Index per the selection process, the underlying portfolio weights are rebalanced for all constituents in the Index.

• Even if no new constituents are added to the Index, the Index is still rebalanced every September.

The changes are incorporated based on the following timeline:

• Final Index constituents are selected, and weights are calculated, based on the data as of the Selection Date, which is two weeks prior to the third Friday in March/September.

• Index shares are frozen on the third Friday in March/September, the Reference Date, using the weights determined on the Selection Date.

• The rebalanced/reconstituted portfolio becomes effective on the close five trading days after the third Friday in March/September, referred to as the Effective Date.

Base Date, Base Value and Currency

The Index was calculated with a base value of 1,000 as of November 30, 2017. The Index currency is USD.

Index Calculation

Price Return Index Value = \( \frac{\text{Combined Market Value of Assigned Shares of All Components}}{\text{Divisor}} \)
\[ I(t) = \frac{\sum_{i=1}^{n} P_{i(t)} \times S_{i(t)}}{D(t)} \]

where:

- \( I(t) \) = Price Index value at time \( t \)
- \( D(t) \) = Divisor at time \( t \)
- \( n \) = Number of stocks in the index
- \( t \) = The time the index is calculated
- \( P_{i(t)} \) = Price of stock \( i \) at time \( t \) in USD
- \( S_{i(t)} \) = Number of assigned shares of stock \( i \) at time \( t \)
The initial index divisor is determined using the following equation:

\[
D(o) = \frac{\sum_{i=1}^{n} P_{i(o)} \times S_{i(o)}}{I(o)}
\]

where:

- \( I(o) \) = Base index value at base date
- \( D_o \) = Initial divisor at base date
- \( n \) = Number of stocks in the index
- \( P_{i(o)} \) = Closing price of stock \( (i) \) at base date in USD
- \( S_{i(o)} \) = Number of assigned shares of stock \( (i) \) at base date

Assigned shares are the number of shares needed for each component such that the component conforms to the weighting distribution established at rebalance.

Changes to the index composition require divisor adjustments in order to retain index continuity before and after corporate actions. Divisor changes are made according to the following formula:

\[
D(t+1) = D(t) \times \frac{\sum_{i=1}^{n} P_{i(t+1)} \times S_{i(t+1)}}{\sum_{i=1}^{n} P_{i(t)} \times S_{i(t)}}
\]

where:

- \( D_{t+1} \) = Divisor after changes are made to the index
- \( P_{i(t+1)} \) = Price of each stock after index changes in USD
- \( S_{i(t+1)} \) = Number of assigned shares of each stock after index changes
- \( D_{t} \) = Divisor before changes are made to the index
- \( P_{i(t)} \) = Price of each stock prior to index changes in USD
- \( S_{i(t)} \) = Number of assigned shares of each stock prior to index changes

The total return index is calculated using the following basic equations:

For the Total Return Index, dividends are reinvested on the ex-date. Calculate the total dividend paid on a given day and convert this figure into points of the price index using the following formula:
Total Daily Dividend = \sum (DV_{(i)} * S_{(i)})

where:

\( DV_{(i)} \) = Dividend paid of stock (i) at time (t) in USD
\( S_{(i)} \) = Number of assigned shares of stock (i) at time (t)
\( t \) = The time the index is calculated

Convert Total Daily Dividend into index points by dividing “Total Daily Dividend” by the divisor for the price index using the following formula:

\[
\text{Index Dividend} = \frac{\text{Total Daily Dividend}}{D_{(0)}}
\]

where:

\( D_{(0)} \) = Price Index Divisor at time (t)

Calculate the one day total return of the price index using the following formula:

\[
\text{Index Daily Total Return}_{(t)} = \left( \frac{I_{(t)} + \text{Index Dividend}_{(t)}}{I_{(t-1)}} - 1 \right)
\]

where:

\( I_{(t)} \) = Price Index level at time (t)
\( I_{(t-1)} \) = Price Index level at time (t-1)

Use “Index Daily Total Return” calculated in the prior step to determine the current day total return index level using the following formula:

\[
\text{Total Return Index}_{(t)} = \left( \text{Total Return Index}_{(t-1)} \right) \times \left( 1 + \text{Index Daily Total Return}_{(t)} \right)
\]

where:

Total Return Index \( _{(t)} \) = Total Return Index level at time (t)
Total Return Index \( _{(t-1)} \) = Total Return Index level at time (t-1)
Index Maintenance

Changes in Constituents

The general treatment of additions and deletions aims at minimizing turnover in the Index.

- **Additions** – New constituents are considered for inclusion during the semiannual reconstitution periods.
- **Deletions** – In the event a constituent is delisted, acquired or goes bankrupt, the constituent is removed from the Index. Constituents deleted between reconstitution dates are not replaced.

Corporate Actions

- **Spin-offs, Rights Offerings, Stock Splits** – Constituent prices and share counts are adjusted. In the event a constituent is spun-off, the remaining constituents will be evaluated for eligibility and possible addition to the Index.
- **Dividends** – For the Total Return Index, dividends are reinvested on the ex-date.
- **Mergers/Acquisitions**
  - Merger between two Index components (stock consideration): Target company is deleted on delisting date, and cash is held until next reconstitution date.
  - Merger between two Index components (cash and stock consideration): Target company is deleted on delisting date, and cash is held until next reconstitution date.
  - Merger between two Index components (cash consideration): Target company is deleted on delisting date, and cash is held until next reconstitution date.
  - Merger between non-component and Index component: Target company is deleted on delisting date, and cash is held until next reconstitution date.
  - In special circumstances where an Index component is delisted without advance notice, the Committee will evaluate on a case-by-case basis.

Index Committee

The Index is maintained by the Reality Shares Index Committee and advised by Nasdaq. The Committee meets monthly and as necessary on an ad hoc basis to review performance of the Index and to consider any overrides to the Index methodology procedures. At each meeting, the Index Committee reviews Corporate Actions that may affect constituents, along with any significant market events. In addition, the Index Committee may revise Index policy covering rules for selecting constituents, treatment of dividends, share counts or other matters, or may override selected outcomes of such Index policy on a case-by-case basis.