

# ***BlueStar Blockchain Technology Index***

## **Index Methodology Guide 1.0**

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## Chapter 1: Introduction and Index Description

This document summarizes the methodology and rules used to construct, calculate, and maintain the BlueStar Blockchain Technology Index (“BBLK”).

BBLK is a rules-based index that tracks the performance of a group of globally-listed stocks of companies that, according to BlueStar Indexes, are “Blockchain Companies”. The index focuses on companies developing technology or industry platforms or standards, serve as consultants to clients adopting blockchain technology, or provide hardware required for the implementation of blockchains. Index components are reviewed semi-annually for eligibility, and the weights are re-set accordingly.

Companies may not apply and may not be nominated for inclusion in the Index. Companies are added or removed by BlueStar based on the methodology described herein. The BlueStar Index Advisory Committee advises on index methodology and decisions related to the definition of which companies shall be considered Blockchain Companies. Whenever possible, BlueStar will publicly announce changes to the index on its website at least five trading days in advance of the actual change. The Index is calculated and maintained by Standard & Poor’s based on a methodology developed by BlueStar.

BBLK is calculated on a price, total return and net total return basis in real-time. The index is denominated in US Dollars (USD). The net total return index is disseminated in real-time via the CME Group, Inc (CME) and market data vendors every day the exchange of at least one index component is open. Real-time index values for the net total return index are available on Bloomberg by entering “BBLKNTR INDEX <GO>”, and end-of-day values are freely available on BlueStar’s website, [www.bluestarindexes.com](http://www.bluestarindexes.com), and/or through market data vendors.

## Chapter 2: Index Construction

This chapter outlines and defines the key steps in constructing and calculating the index, including: eligibility requirements, formulas, initial component selection, and special adjustments

### 2.1 Base Date and Value

BBLK has the following variants, base dates and values:

Name	Index Symbol	Base Date	Base Value
BlueStar Blockchain Technology Index (Price Index)	BBLK	Dec. 30, 2015	100
BlueStar Blockchain Technology Index Total Return	BBLKTR	Dec. 30, 2015	100
BlueStar Blockchain Technology Index Net Total Return	BBLKNTR	Dec. 30, 2015	100

### 2.2 Component Eligibility Requirements

All the following requirements must be met for a company’s security to be included in BBLK:

1. BlueStar screens a universe of thousands of global securities for companies leading in blockchain technology in one or more of the categories in the table below. For the avoidance of doubt, the index will not include companies whose activity is investing, holding or mining of crypto currencies.” BlueStar screens company descriptions on bona-fide sources such as Bloomberg LP, as well as company annual filings and websites to identify the global watch list of potential Blockchain Companies.

Category	Description
Founding Members	Founding or original members in leading blockchain groups/consortium such as Linux Hyperledger, Enterprise Ethereum Alliance, R3 Corda, and Blockchain in Transportation Alliance
Consultants or Platforms	I.T. services or consulting companies that are building blockchains for customers, or are actively engaged in consulting/research projects for clients related to blockchain implementation
Technology Infrastructure	Companies manufacturing hardware, typically specialized processing units and memory devices, required for the expanded use of blockchain, or software enabling the use of virtual tokens/crypto currencies as a means of payment. Companies directly involved in mining crypto currencies will not be considered for inclusion in the global watch list.
Launched Program	Financial, technology and industry leaders that are currently using blockchain for customer/consortium use.
Leaders	Companies that are both Founding Members and Consultants/Platform Providers. This definition will be used in most, but not all, cases.
Launched Pilot Program	Companies in any industry that have launched pilot programs or have tested use cases on blockchain.
Active Investor	Companies which, according to publicly-available information are participating in blockchain mostly through venture capital or strategic investments.
Industry Pioneer & Research Mode	Companies that are beginning to use blockchain for very industry-specific uses or are investing in R&D related to blockchain but not yet launched a live program.

2. The global universe of Blockchain Companies are those that are categorized in 2.2.1, above, as: Founding Members, Consultants or Platforms, Technology Infrastructure, Launched Program, or Leaders. Collectively, companies in those categories are referred to as Blockchain Companies.

3. Companies included in the global universe of Blockchain Companies are then screened to meet Index market capitalization and liquidity criteria. Only those companies included in the global universe of Blockchain Companies which have a free-float percentage greater than 10%, market capitalization of at least \$150 million USD equivalent and a six-month average daily value traded of at least \$500,000 USD equivalent will be selected for inclusion in the index. For securities that do not have six months of average daily value traded data available, three months of data will be used and their eligibility for inclusion will be reviewed by the BlueStar Index Advisory Committee, which will consider factors such as liquidity over the time frame for which data is available and market capitalization.
  
4. Only those securities denominated in the following currencies may be included in the index:

<b>Currencies</b>			
US Dollar	Australian Dollar	Israeli Shekel	Japanese Yen
Euro	Canadian Dollar	British Pound	Swiss Franc
Hong Kong Dollar			

BlueStar will, in most cases, use the quantitative ranking and screening system described herein. However, subjective screening based on fundamental analysis or other factors may be used if, in the opinion of BlueStar Indexes, certain components should be included or excluded.

## 2.3 Initial Component Selection

The following steps are taken to select the initial components for BBLK at each semi-annual rebalance period:

1. Establish the list of index components according to Chapter 2.2
2. Determine the index weight of each security in the list of index components:
  - a. Determine whether each component is a member of the Technology Infrastructure or Leaders categories, together referred to as “Tech and Leaders” (TL) or a member of another category, referred to as “Others” (OT).
  - b. Assign each component an Initial Weight as follows:

$$W'IT_i = 0.75 * \left( \frac{1}{N_{TL}} \right) \quad \text{AND} \quad W'NIT_i = 0.25 * \left( \frac{1}{N_{OT}} \right)$$

Where:

$W'TL_i$  = Initial Weight for Tech and Leaders component  $i$   
 $W'OT_i$  = Initial Weight for Others component  $i$   
 $N_{TL}$  = Total number of Tech and Leaders index components  
 $N_{OT}$  = Total number of Others index components

- c. If the aggregate Initial Weight of securities denominated in US Dollars (USD) is greater than or equal to 75% then the weights as determined in step 2.b, above, will be each component’s Final Weight
- d. If the aggregate Initial Weight of securities denominated in US Dollars (USD), as determined in step 2.b, above, is less than 75% then find each component’s Final Weight by redistributing the weight of non-USD-denominated (NUSD) such that the aggregate weight of USD-denominated securities is equal to 75% as follows:

$$W_{USD_i} = W'_{USD_i} + DIST_{USD} \quad \text{AND} \quad W_{NUSD_i} = W'_{NUSD_i} - DIST_{NUSD}$$

Where:

$$DIST_{USD} = \frac{.75 - AW_{USD}}{N_{USD}} \quad \text{AND} \quad DIST_{NUSD} = \frac{.75 - AW_{USD}}{N_{NUSD}}$$

And:

$W_{USD}$  = Final Weight of USD-denominated index components  
 $W_{NUSD}$  = Final Weight of non-USD-denominated index components  
 $W'_{USD_i}$  = Initial Weight of USD-denominated index components  
 $W'_{NUSD_i}$  = Initial Weight of non-USD-denominated index components  
 $DIST_{USD}$  = Weight to be added to each USD-denominated index component  
 $DIST_{NUSD}$  = Weight to be subtracted from each non-USD-denominated index component  
 $AW_{USD}$  = Aggregate Initial Weight of USD-denominated index components  
 $N_{USD}$  = Total number of USD-denominated index components  
 $N_{NUSD}$  = Total number of non-USD-denominated index components

## 2.4 Dividend Treatment

The price index does not take normal dividend payments into account. Dividends are accounted for by reinvesting them daily. BBLK uses the ex-dividend date to determine the total daily dividends for each day. Special dividends require an index advisor adjustment, as described in Chapter 3, to prevent such distributions from distorting the price index.

## 2.5 Index Equations

1. The price index is calculated using the following basic equations:

$$I_{(t)} = \frac{\sum_{i=1}^n P_{i(t)} * S_{i(t)}}{D_{(t)}}$$

Where:

- $I_{(t)}$  = Index value at time  $(t)$
- $D_{(t)}$  = Divisor at time  $(t)$
- $n$  = Number of stocks in the index
- $t$  = The time that the index is calculated
- $P_{i(t)}$  = Price of stock  $i$  at time  $t$  in USD terms
- $S_{i(t)}$  = Number of assigned shares of stock  $i$  at time  $t$

Where:

$$D_{(t)} = \frac{\sum_{i=1}^n P_{i(t-1)} * S_{i(t-1)}}{I_{(t-1)}}$$

Where:

- $I_{(t-1)}$  = Index value at time  $t-1$
- $D_{(t)}$  = Divisor at time  $t$
- $n$  = Number of stocks in the index
- $P_{i(t-1)}$  = Closing price of stock  $i$  at time  $t-1$  in USD terms
- $S_{i(t-1)}$  = Number of assigned shares of stock  $i$  at time  $t-1$

Where:

$$D_{(0)} = \frac{\sum_{i=1}^n P_{i(0)} * S_{i(0)}}{I_{(0)}}$$

Where:

- $I_{(0)}$  = Index value at time  $0$  100
- $D_{(0)}$  = Divisor at time  $0$
- $n$  = Number of stocks in the index
- $P_{i(t-1)}$  = Closing price of stock  $i$  at time  $0$  in USD terms
- $S_{i(t-1)}$  = Number of assigned shares of stock  $i$  at time  $0$

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2. Assigned shares are the number of shares needed for each component such that the component conforms to the weighting distribution outlined in Chapter 2.3.2
3. Changes to the index composition require divisor adjustments to retain index continuity before and after specific events, as outlined in Chapter 3. Divisor changes are made according to the following equation:

$$D_{(t+1)} = D_{(t)} * \frac{\sum_{i=1}^n P_{i(t+1)} * S_{i(t+1)}}{\sum_{i=1}^n P_{i(t)} * S_{i(t)}}$$

Where:

$D_{(t+1)}$  = Initial Divisor after changes are made to the index

## Chapter 3: Index Maintenance

This chapter describes the circumstances that require index changes, as well as the details on performing those changes

### 3.1 Divisor Changes

Changes to the index composition due to corporate actions or component eligibility changes will require adjustments to the index divisor, as follows:

#### *Spinoff\**

1. Subtract the following from the price of the parent company:

$$\frac{\text{Spinoff stock price}}{\text{Share exchange ratio}}$$

2. Adjust the component's assigned shares such that its weighting is not changed because of the spinoff

#### *Special Cash Dividend*

1. Subtract special dividend from share price

#### *Rights Offering*

1. Subtract the following from the price of the parent company:

$$\frac{\text{Price of rights}}{\text{Rights ratio}}$$

2. Adjust the component's assigned shares such that its weighting is not changed because of the rights offering

Divisor changes are usually made on the date the corporate action becomes effective. For example, BBLK uses the ex-dividend date rather than the payment date to determine when making divisor adjustments.

\*If a company being spun-off is only trading on a "when-issued" basis, the "when-issued" price will be used to adjust the parent company's closing price.

### 3.2 Details of Share Changes

Stock splits and reverse splits do not require index divisor adjustments because the corresponding change to the stock price equally offsets the number of assigned shares, therefore not affecting the component's influence in the index.

### 3.3 Scheduled Component Changes and Review

BBLK has a semi-annual review in June and December of each year. Fundamental data, prices and trading volumes are captured on the Tuesday before the second Friday of June and December. The new number of assigned shares for each component is determined based on the component's weight as determined in 2.3 and the closing price of that component on the Tuesday before the second Friday of June and December. Component changes are announced and made available after the close on the second Friday of June and December. Component changes are made after the close on the third Friday of June and December and are effective at the opening on the Monday following the third Friday of June and December.

### 3.4 Interim Component Changes

1. Component changes may occur between regularly-scheduled review periods if a specific corporate event makes an existing component ineligible. The following events may require a component's removal or replacement:

#### *Merger or Acquisition*

If a merger or acquisition results in one component absorbing another, the resulting company will remain a component and the absorbed company will be removed or replaced. If a non-component company absorbs a component company, the original component will be removed, unless the non-component company, after absorbing the assets of the component company, would be considered a Blockchain company as described in Chapter 2.2. If a component is the target of an acquisition BlueStar may decide to remove or reduce the weight of that component after the "go-shop" period concludes in order to reduce potential volatility or liquidity risk in the index.

#### *Spin-Off*

If a company splits or spins off a portion of its business to form one or more new companies, the resulting company with the highest market value will remain a component if it meets the eligibility requirement. The remaining companies will be evaluated for eligibility and possible addition to the index.

#### *Bankruptcy*

A component company will be removed and replaced immediately after bankruptcy filing. Exceptions are made on a case-by-case basis. For example, a security may not be removed immediately if bankruptcy filing is not the result of operating or financial difficulties.

#### *Delisting*

A component company will be removed or replaced immediately after being delisted from its primary market.

Whenever possible, interim component changes are announced on BlueStar's publicly-available website at least three trading days prior to component changes becoming effective.

### **3.5 Unscheduled Component Weight Adjustments**

Unscheduled component weight adjustments may occur between review periods if any component's weight increases by more than 300% from the component's weight at the most recent Index rebalance date. The weight of any such component will be reduced to the weight of the next-highest-weighted component. The absolute weight limit for any component between rebalance periods shall be 25%

If the aggregate weight of non-US-listed securities rises above 29% between regularly-scheduled rebalance periods, the index components will be rebalanced such that the aggregate weight of all non-US-listed securities will be 25% or less of the total index.

Whenever possible, unscheduled component weight adjustments are announced on BlueStar's publicly available website at least three trading days prior to the adjustments becoming effective.

## Chapter 4: Index Calculation and Dissemination

This chapter summarizes calculation and dissemination practices, quality assurance practices, and the circumstances requiring calculation corrections.

### 4.1 Price Calculation

Price, total return, and net total return indexes for BBLK are calculated by Standard & Poor's on both an end-of-day and real-time basis. The BBLK is calculated using the last traded price for each company in the Index from the relevant exchanges and markets.

Index values are rounded to two decimal places and divisors are rounded to 14 decimal places.

### 4.2 Calculation Frequency and Dissemination

BBLK is calculated on a real-time basis beginning when the first traded price of any of the Index components is received by Standard & Poor's. Prices are delivered to CME every 15 seconds and subsequently published at that frequency. Net total return index values are available on a real-time basis through the Bloomberg information system under the index symbol "BBLKNTR INDEX". End-of-day net total return index values are posted on BlueStar's publicly available website, [www.bluestarindexes.com](http://www.bluestarindexes.com).

If the exchange a stock is listed on is closed or if trading in a stock is suspended prior to the market opening, the stock's adjusted closing price from the previous day will be used in the Index calculation until trading commences. If trading in a stock is suspended while the relevant market is open, the last traded price for that stock will be used for all subsequent Index calculations until trading resumes.

### 4.3 Input Data

Standard & Poor's uses various quality assurance tools to audit, monitor, and maintain the accuracy of its input data. While every reasonable effort is taken to ensure high standards of data integrity, there is no guarantee against errors. Please refer to the Data Correction section for more detail.

The index closing price is calculated using the closing prices issued by the primary exchange for each component stock in the index. If the primary exchange changes the closing price of a component stock, the new price will be used to calculate the index closing price. A final check of closing prices is done between one hour and one and one-half hours after the close of markets. This timeframe may be expanded at S&P's discretion on days where trading volume is unusually large at the close. For example, futures and options expiration dates, and large index rebalancing dates often result in unusually large volume. Only changes received prior to this final check are used in the closing price calculation.

Real time index prices are calculated using spot prices for foreign exchange rates throughout each trading day. Official end-of-day index values are calculated using Reuters spot rates which are captured at 12:00 GMT.

#### **4.4 Data Corrections**

Incorrect index component data, corporate action data, or Index Divisors will be corrected upon detection. If such errors are discovered within five days of occurrence, they will be corrected that same day. If discovered after five days, adjustments will be handled on a case-by-case basis depending on the significance of the error and the feasibility of a correction.

Incorrect intraday index tick data will not be corrected. However, incorrect opening and closing values will be corrected as soon as possible after detection.

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## **Appendices**

This section provides additional information related to BBLK as well as changes to this document.

## Appendix A. BlueStar Blockchain Technology Index Constituents

As of December 15, 2017

Company Name	Ticker	Exchange	Weight
ACCENTURE PLC-CL A	ACN	NYSE	3.17%
ADVANCED MICRO DEVICES	AMD	Nasdaq	3.17%
AMERICAN EXPRESS CO	AXP	NYSE	3.17%
BAIDU INC - SPON ADR	BIDU	Nasdaq	3.17%
CISCO SYSTEMS INC	CSCO	Nasdaq	3.17%
INTEL CORP	INTC	Nasdaq	3.17%
INTL BUSINESS MACHINES CORP	IBM	NYSE	3.17%
JPMORGAN CHASE & CO	JPM	NYSE	3.17%
MICRON TECHNOLOGY INC	MU	Nasdaq	3.17%
NETEASE INC-ADR	NTES	Nasdaq	3.17%
NVIDIA CORP	NVDA	Nasdaq	3.17%
OVERSTOCK.COM INC	OSTK	Nasdaq	3.17%
QUALCOMM INC	QCOM	Nasdaq	3.17%
SAP SE-SPONSORED ADR	SAP	NYSE	3.17%
TAIWAN SEMICONDUCTOR-SP ADR	TSM	NYSE	3.17%
TEXAS INSTRUMENTS INC	TXN	Nasdaq	3.17%
WIPRO LTD-ADR	WIT	NYSE	3.17%
XILINX INC	XLNX	Nasdaq	3.17%
AIRBUS SE	AIR	EN Paris	3.02%
DAIMLER AG-REGISTERED SHARES	DAI	Xetra	3.02%
FUJITSU LTD	6702	Tokyo	3.02%
HITACHI LTD	6501	Tokyo	3.02%
NEC CORP	6701	Tokyo	3.02%
UBS GROUP AG-REG	UBSG	SIX Swiss Ex	3.02%
ALIBABA GROUP HOLDING-SP ADR	BABA	NYSE	0.62%
BANCO SANTANDER SA-SPON ADR	SAN	NYSE	0.62%
BANK OF AMERICA CORP	BAC	NYSE	0.62%
BANK OF NEW YORK MELLON CORP	BK	NYSE	0.62%
CITIGROUP INC	C	NYSE	0.62%
CME GROUP INC	CME	Nasdaq	0.62%
COGNIZANT TECH SOLUTIONS-A	CTSH	Nasdaq	0.62%
CREDIT SUISSE GROUP-SPON ADR	CS	NYSE	0.62%
EASTMAN KODAK CO	KODK	NYSE	0.62%
FEDEX CORP	FDX	NYSE	0.62%
GENPACT LTD	G	NYSE	0.62%
GOLDMAN SACHS GROUP INC	GS	NYSE	0.62%
HEWLETT PACKARD ENTERPRISE	HPE	NYSE	0.62%
INFOSYS LTD-SP ADR	INFY	NYSE	0.62%
INTUIT INC	INTU	Nasdaq	0.62%
MASTERCARD INC - A	MA	NYSE	0.62%
MICROSOFT CORP	MSFT	Nasdaq	0.62%
MONEYGRAM INTERNATIONAL INC	MGI	Nasdaq	0.62%
NASDAQ INC	NDAQ	Nasdaq	0.62%
ORACLE CORP	ORCL	NYSE	0.62%
PAYPAL HOLDINGS INC	PYPL	Nasdaq	0.62%
RED HAT INC	RHT	NYSE	0.62%
SAMSUNG ELECTR-GDR	SMSN	London Intl	0.62%
SPRINT CORP	S	NYSE	0.62%
SQUARE INC - A	SQ	NYSE	0.62%
UNITED PARCEL SERVICE-CL B	UPS	NYSE	0.62%
VIRTUSA CORP	VRTU	Nasdaq	0.62%
VISA INC-CLASS A SHARES	V	NYSE	0.62%
WALMART INC	WMT	NYSE	0.62%
ATOS SE	ATO	EN Paris	0.46%
BNP PARIBAS	BNP	EN Paris	0.46%
BOC HONG KONG HOLDINGS LTD	2388	Hong Kong	0.46%
BP PLC	BP/	London	0.46%
BRIDGESTONE CORP	5108	Tokyo	0.46%
CAPGEMINI SE	CAP	EN Paris	0.46%
CGI GROUP INC - CLASS A	GIB/A	Toronto	0.46%
DEUTSCHE BOERSE AG	DB1	Xetra	0.46%
KBC GROEP NV	KBC	EN Brussels	0.46%
NOKIA OYJ	NOKIA	Helsinki	0.46%
REPLY SPA	REY	Brsaltaliana	0.46%
SOFTWARE AG	SOW	Xetra	0.46%
TENCENT HOLDINGS LTD	700	Hong Kong	0.46%
THOMSON REUTERS CORP	TRI	Toronto	0.46%
WORLDLINE SA	WLN	EN Paris	0.46%

## Appendix B. Index Stats and Allocations

*As of December 15, 2017*

Geographic Breakdown		
Country of Domicile	Number	Weight
United States	36	52.88%
Japan	4	9.51%
China	4	7.42%
Germany	4	7.11%
France	5	4.86%
India	2	3.79%
Switzerland	2	3.63%
Ireland	1	3.17%
Taiwan	1	3.17%
Canada	2	0.92%
Spain	1	0.62%
South Korea	1	0.62%
Belgium	1	0.46%
Finland	1	0.46%
Italy	1	0.46%
Britain	1	0.46%
Hong Kong	1	0.46%
Sector Breakdown		
Sector	Number	Weight
Information Technology	43	70.81%
Financials	16	16.60%
Consumer Discretionary	3	6.65%
Industrials	3	4.25%
Telecommunication Services	1	0.62%
Consumer Staples	1	0.62%
Energy	1	0.46%
Totals		
Totals	Number	Weight
Total	68	100.00%

## Appendix C. Document Change History

A history of significant changes to this document is shown in the table below

Issue	Date	Change
1.0	March 19, 2018	Initial publication