



Exchange Benchmark Report

April 2022

CryptoCompare Research
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In partnership with



Mission Statement

CryptoCompare's Exchange Benchmark was established in 2019 as a tool to bring clarity to the digital asset exchange sector. It provides a **framework for assessing risk** and brings **transparency** and **accountability** to a complex and rapidly evolving market. Since launching, it has become an industry standard for evaluating exchanges. Over time, the methodology has also expanded and is now approached in several dimensions using a comprehensive data set, covering 150 exchanges across 8 categories of evaluation:

- Legal/Regulation
- KYC/Transaction Risk
- Data Provision
- Security
- Team/Exchange
- Asset Quality/Diversity
- Market Quality
- Negative Events Penalty

We adopt an innovative ranking methodology that utilises a combination of **qualitative** and **quantitative** metrics. We assign a grade to each exchange which helps **identify the lowest risk** exchanges in the industry. The Benchmark is backed by thousands of research hours and covers over 80 qualitative and quantitative metrics.

What do the grades mean?

The Exchange Benchmark ranks exchanges from AA-E. We classify a **Top-Tier** exchange as any in the **AA-B** bracket and **Lower-Tier** exchanges as those graded **C-E**. Exchanges in the Top-Tier meet our minimum threshold for acceptable risk.

What the grading is not

This grading **does not connote overall superiority**, instead it represents a means of ranking exchanges according to **risk**. The Exchange Benchmark does not serve as a guide to which platform is superior for trading, nor the reliability of reported volumes.

Who is the Benchmark for?



Exchanges looking to conduct thorough competitor analysis, understand industry trends and areas for competitive parity.



Funds looking to assess counterparty risk and opportunities in digital asset markets.



Exchange service providers such as insurers, custodians and compliance services who want to gain a better understanding of the industry and identify potential customers.



Regulators who are looking to develop policy, or better understand the global digital asset landscape.



Investors and Traders who want to identify the least risky venues for trading.

Get the Benchmark scores using our [API](#)

Find out More About [Custom Data](#)

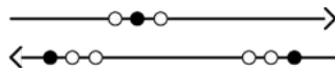
Thanks to Our Collaborators



CIPHERTRACE



Cryptocurrency
Compliance



Monitor Risky
Payments



Identify Money
Laundering



Travel Rule
Compliance



Investigate
Financial Crime

Learn more at www.ciphertrace.com



Advancing digital finance

Our members are industry experts, business leaders, and technologists, committed to championing the new era of digital commerce.

Our community is:

- Establishing best practices and governance standards
- Conducting global regulatory and policy maker outreach
- Curating and sharing expert insights

Join us to:

- Demonstrate accountability and commitment to best practices through Code attestation
- Share knowledge by taking part in our events, webinars, calls and more
- Network in a shared engagement forum with market participants, policymakers and regulators

Become a member at gdf.io

24
Consultation responses

10
Codes

125
Events

150+
Members

500
Global members

Our Patron Members



★★★★★ 4.2

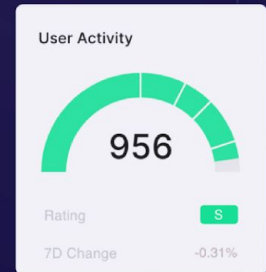
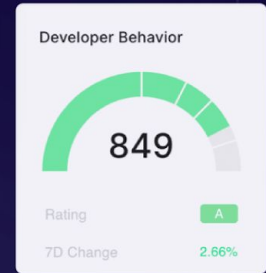
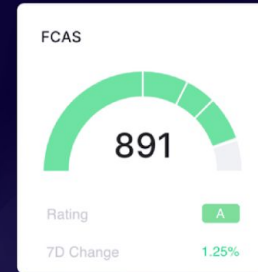
"GDF Codes set global best practices and standards for the Crypto Digital industry."

GDF members survey

Proud to have FCAS as a core component of CryptoCompare's Exchange Benchmark

The Fundamental Crypto Asset Score (FCAS™) is a comparative metric used to assess the fundamental health of crypto projects. In this report it is being used to rate cryptocurrency exchanges based on the average score of the coins they offer.

[Flipsidecrypto.com](https://flipsidecrypto.com) →



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Key Highlights

Key Highlights

Digital Asset Exchanges Receive Updated Rankings.

Coinbase, Gemini, Bitstamp, and Binance are the lowest risk exchanges all receiving AA rankings.

Top-Tier Exchanges Increase Volumes Market Share Top-Tier exchanges have gained volumes market share since August 2021, increasing from 89% in July 2021 (based on Aug 2021 rankings) to an average of 91% in the six month period between September 2021 and February 2022 (based on the latest March 2022 rankings).

Top-Tier Exchanges Decrease Whilst AA-A Ranked Exchanges Increase. Due to stricter benchmark standards, only 78 exchanges met the threshold for Top-Tier status in the latest Exchange Benchmark (vs 87 in August 2021 and 84 in February 2021). Meanwhile, 15 exchanges have met AA-A status compared to 9 in August 2021.

KYC Stringency Requires Improvement on Many Exchanges. 35% of exchanges were rated as having poor or inadequate KYC programs (vs 34% in Aug 2021 and 33% in Feb 2021). 27% of exchanges were found to send funds to higher risk entities for more than 4% (High Risk Range) of transactions according to CipherTrace vs 25% in Aug 2021.

Data Transparency Remains Relatively Unchanged Although Data Quality Standards Need Refining. 16% of exchanges have pushed some form of error prone data or unannounced updates via their REST API or Websocket data feeds over the last year. The proportion of exchanges providing full historical trade data, websocket feeds and order book endpoints is similar to previous rankings. However, 71% of exchanges now provide historical candlestick data (vs 68% in Aug 2021 and 53% in Feb 2021).

Legal/Regulation Standards Steadily Improving. 11% of exchanges formally offer some form of cryptocurrency insurance (vs 10% in Aug 2021 and 9% in Feb 2021) while 7% of exchanges claim to informally insure users in the case of breach (insurance fund) - (vs 9% in Aug 2021 and 3% in Feb 2021). Licensed/MSB registered exchanges have also increased from 36% in Aug 2021 to 42%.

The methodology and rankings themselves are free and transparent and serve as a tool for market participants to choose the lowest risk platforms. The underlying data and custom research is also available to those looking to gain deeper insights. Get in touch by contacting us at research@cryptocompare.com

New Metrics Incorporated Since August 2021

Bug Bounties: There have been a number of hacks over the last year in the digital asset space that highlight the importance of security for centralised exchanges. An important system that many exchanges have in place is the use of bug bounties, where hackers or security researchers are financially rewarded for identifying bugs or security vulnerabilities within exchanges. Having such a program in place should be seen as a reduction in security risk for exchanges.

Suspicious Activity Details: Previously, suspicious activities were all treated equally. We have noted that these can differ greatly from a risk perspective. Because of this we now provide further scoring which is dependent on the type of suspicious activity. Data breaches and major fines are penalised to the largest extent, followed by minor fines, withdrawal freezes and flash crashes, and then lawsuit/accusations and other minor charges.

Volumes: In the past, the benchmark did not rank exchanges based on their absolute size (measured by volume) due to the various issues that were prevalent in this metric. This includes the extensive use of short term incentives or illicit activities such as wash trading. However, these practices have become more uncommon. Thus, we believe it is now appropriate to incorporate volumes into the Market Quality score.

Volumes Per Staff: We also note that exchanges with extremely high volumes are typically those that have been in the industry for a notable period of time, and have built up the resources and team required to sustain such volumes. Conversely, it would be unusual for an exchange to have high volumes with a low number of staff. Such exchanges should be considered higher risk than others.

Institutional and Corporate Solution Offerings: Various exchanges provide extended services for institutional and corporate clients (professional traders, investment managers, hedge funds, etc...). These services are coupled with more substantial requisites when it comes to security, regulatory oversight, and KYC requirements. Provision of these services will impact scores in these fields.

Regulated and Audited Custody Providers: An unfortunate consequence of the growth in the digital asset industry is the increase in the number and severity of hacks across the whole sector. For this reason the use of reliable custodians by exchanges is fundamental to preserving the security of users. Thus, the scoring of custodians will now also include an assessment of whether the provider is regulated and audited.

Methodology Update

It is necessary for the risk assessment of exchanges to continue to develop as financial regulators increase their scrutiny of the industry; and a wider range of stakeholders enter the market. Because of this, the Exchange Benchmark Methodology has been updated to be more in line with the latest developments in the industry. These changes include:

- **The minimum score required to achieve a BB and A rating has increased from 55 to 60 and from 65 to 70 respectively.**
- **The weightings of the *Legal/Regulation* and *Security* categories have increased from 15% to 17.5% each, while the weight of the *Team/Exchange* category has decreased from 15% to 10%.**
- **AA-A category thresholds have been adjusted so that per every category threshold broken, the exchange's highest potential scores falls below an AA. For example, if an exchange does not meet one threshold, the maximum grade attainable will be an A. Similarly, if an exchange does not meet two thresholds, the maximum grade attainable will be a BB.**
- **We have added new thresholds to the 'Quality/Diversity of Assets' and 'Negative Penalties' categories.**
- **Exchanges which do not have data available to assess market quality will receive the 40th percentile score of the whole data set.**
- **Addition of new metrics stated in the previous slide.**

Methodology Overview - Aggregation and Grading

Scores from each category are aggregated to form a total cumulative score. The **maximum score is 100**.

Minimum Threshold for AA-A Status

To ensure that only the lowest risk exchanges achieve AA - A status, we have created minimum thresholds across certain categories. For KYC/Transaction Risk, Security, Team/Exchange, Asset Quality/Diversity and Legal/Regulatory categories, exchanges must score 60% or above. For Market Quality, exchanges must score 50% or above. If an exchange has received a negative penalty, they have not met that threshold. In addition, exchanges must achieve green KYC and interaction risk scores in line with CipherTrace's transaction risk data.

If an exchange breaches one threshold, the maximum grade they can achieve drops from AA to A. If two thresholds are breached, the maximum grade possible is a BB. The thresholds only apply to AA-A status.

Category	Maximum Points	Minimum Threshold for AA-A Status
Security	17.5	10.5 (60%)
Legal/Regulation	17.5	10.5 (60%)
KYC/Transaction Risk	15	9 (60%)
Team/Company	10	-
Data Provision	15	-
Asset Quality/Diversity	5	3 (60%)
Market Quality	20	10 (50%)
Negative Penalty	-5	0
Total Cumulative Points Available	100	

Threshold	Grade
Above 75	AA
70-75	A
60-70	BB
45-60	B
35-45	C
20-35	D
10-20	E
<10	F

Ranking Methodology Overview

Methodology Overview - Scope

Scope and Objectives

We combine over **80 qualitative and quantitative metrics** to assign a grade to **150 active spot exchanges**. Each metric is converted into a series of points based on clearly defined criteria. Metrics were categorised into several buckets (see p.16) and distributed fairly to arrive at a final robust score, ensuring that no one metric overly influences the overall exchange ranking.

Grading

A grading system was implemented to assign each exchange a grade (AA, A, BB, B, C, D, E, F) based on its total cumulative score out of 100. **Top-Tier** exchanges refer to those that have scored at least 45 points (B and above).

Market Quality

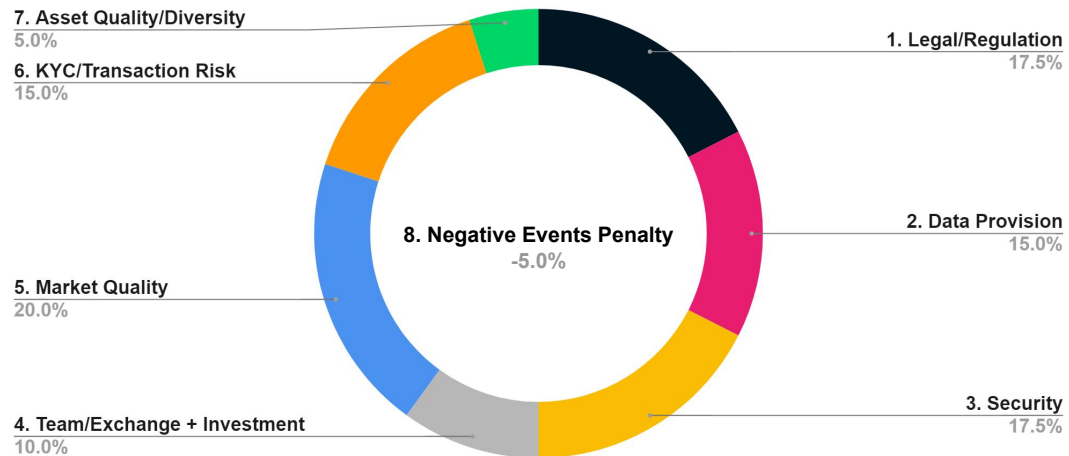
We measure the market quality of each exchange using a combination of volumes figures and 5 metrics (derived from trade and order book data) that aim to measure the cost to trade, liquidity, market stability, behaviour towards sentiment, and “natural” trading behaviour. Exchanges were rated based on a combination of the most liquid Bitcoin (BTC) and Ethereum (ETH) markets. Points were distributed using a rating system that compares each exchange with its peers for each metric, on each applicable market. We then arrive at an overall ranking that is robust across several markets for each exchange.

The market quality points should be considered most instructive **below a minimum threshold - with those scoring below 10 considered higher risk.**

Methodology Overview - Ranking Components

The overall ranking consists of the following components and subsequent weightings:

1. Legal/Regulation
2. Data Provision
3. Security
4. Team/Exchange
5. Market Quality
6. KYC/Transaction Risk
7. Asset Quality/Diversity
8. Penalty Factor: Negative Events (-5%)



Methodology Overview - Data Collection

Due Diligence

Time Period: 10 January 2022 - 18 February 2022

Sources: World Bank (2019 Data)
 Transparency International (2019)
 LinkedIn Profiles
 Crunchbase Profiles
 Exchange Websites
 Github/Other API Documentation
 Companies House
 Media websites (Coindesk, Bloomberg)
 Various MSB Registries
 CipherTrace (Feb 2022)
 FlipsideCrypto (Feb 2022)

Method: Manual Data Collection, Google Form, Collaborators

Market Quality (Trade)

Time Period: 31 January 2022 - 11 February 2022

Sources: Exchange REST APIs (Trade Endpoint)

Method: REST API polling on exchanges

Frequency: At exchange rate limits

Market Quality (Order Book)

Time Period: 31 January 2022 - 11 February 2022

Sources: Exchange REST APIs (Order Book)

Method: REST API polling snapshots

Frequency: ~ Every 10 mins

Markets: BTC-USD, BTC-USDT, BTC-ETH, BTC-KRW, BTC-JPY, ETH-USD, ETH-USDT, ETH-KRW, ETH-JPY...+ OTHER SIGNIFICANT FIAT MARKETS

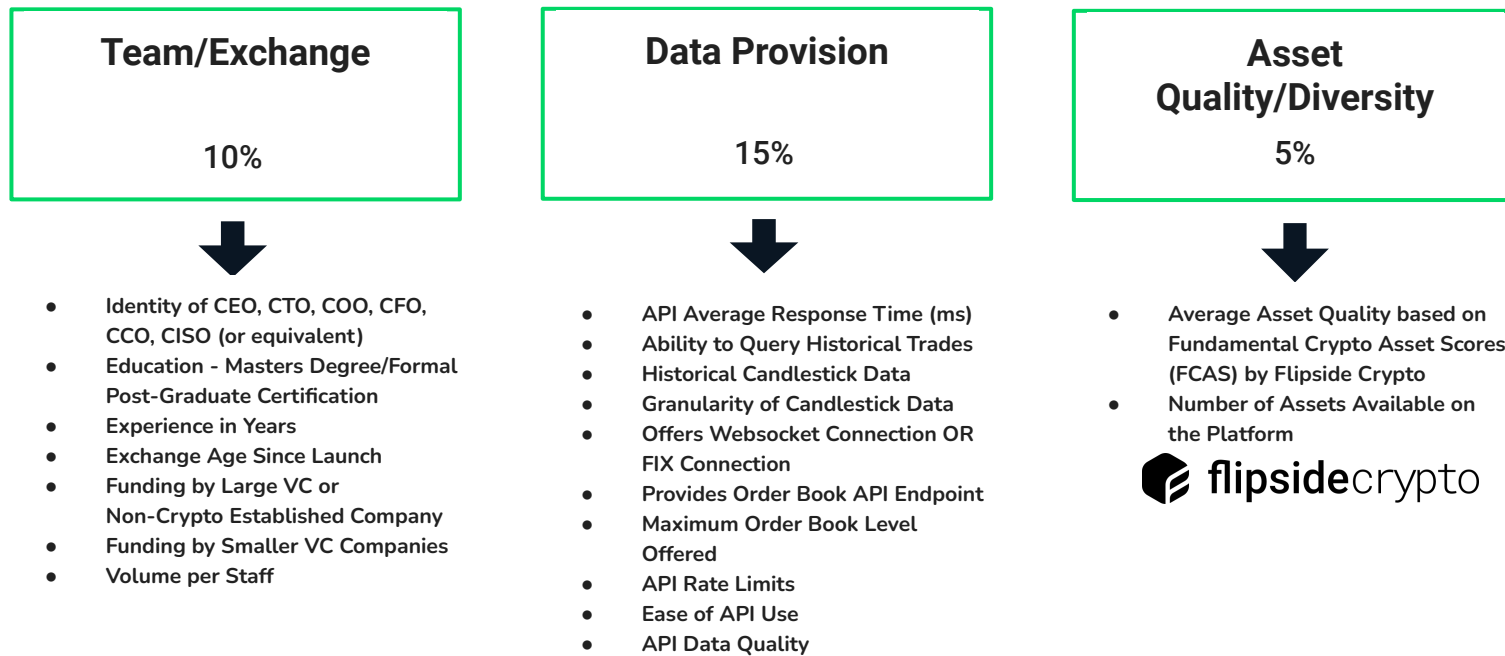
Number of Exchanges: 100+

*We have made our best effort to collect data accurately, but appreciate that certain data points might be outdated or incomplete due to lack of public availability. We are committed to updating and correcting any data point proven to be outdated or incorrect on a timely basis, and will update our Exchange Ranking accordingly.

Methodology Overview - Components I.



Methodology Overview - Components II.



Methodology Overview - Components III.



Results

Exchange Ranking Toplist

Get the Benchmark scores using our [API](#)

Explore the [full ranking](#) on our Benchmark Dashboard

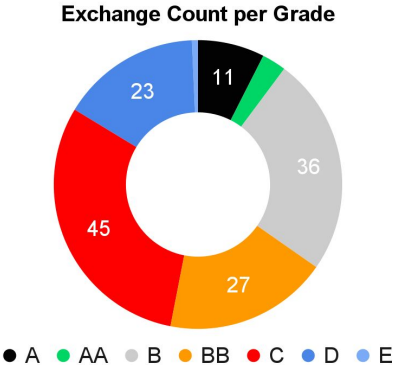
Exchange	KYC/Transaction Risk	Quality/Diversity of Assets	Legal/Regulation	Data Provision	Security	Team/Exchange	Negative Reports	Market Quality	Total	Initial Grade	Final Grade After AA-A Threshold
Coinbase	13.1	4.3	14.9	12.9	17.1	9.7	0.0	17.2	89.11	AA	AA
Gemini	14.7	4.8	13.3	11.1	16.4	7.5	0.0	15.1	82.78	AA	AA
Bitstamp	14.7	4.8	12.9	11.4	11.7	7.1	0.0	16.1	78.68	AA	AA
Binance	11.8	3.5	11.3	12.2	17.1	4.1	0.0	17.3	77.23	AA	AA
Kraken	8.6	5.0	12.5	11.1	12.8	9.5	0.0	16.1	75.58	AA	A
LMAX Digital	13.4	4.0	12.7	7.8	11.8	8.3	0.0	16.1	74.06	A	A
CrossTower	12.8	4.3	13.5	12.7	13.9	6.3	0.0	10.7	74.03	A	A
FTX	11.8	5.0	7.6	14.0	13.6	5.4	0.0	16.5	73.95	A	A
Cex.io	12.6	4.3	12.1	11.1	12.9	8.1	0.0	12.8	73.81	A	A
itBit	12.8	4.0	11.5	11.6	15.4	5.9	0.0	12.5	73.69	A	A
eToroX	11.0	4.8	12.5	10.1	15.7	8.0	0.0	10.8	72.83	A	A
OKCoin	9.9	4.8	14.1	11.6	9.9	9.8	0.0	12.1	72.22	A	A
Bithumb Korea	13.1	3.5	14.1	10.1	8.6	5.6	0.0	16.8	71.72	A	A
Currency.com	10.5	5.0	12.5	9.5	12.0	6.9	0.0	14.8	71.29	A	A
Bitfinex	12.1	3.5	8.4	11.4	10.7	6.9	0.0	17.2	70.31	A	A
Luno	9.3	4.0	12.1	11.1	13.6	8.6	0.0	11.3	69.99	BB	BB
Liquid	12.4	3.5	15.3	11.9	3.2	9.0	0.0	12.1	67.46	BB	BB
Bitpanda Pro	13.1	4.5	10.9	12.2	9.3	7.6	0.0	9.7	67.25	BB	BB
bitFlyer	11.2	4.3	14.9	9.1	6.7	5.6	0.0	15.3	67.00	BB	BB
Exmo	10.5	4.8	13.3	8.5	12.4	6.8	0.0	10.7	66.97	BB	BB

Top-Tier Volumes - Grades B and Above

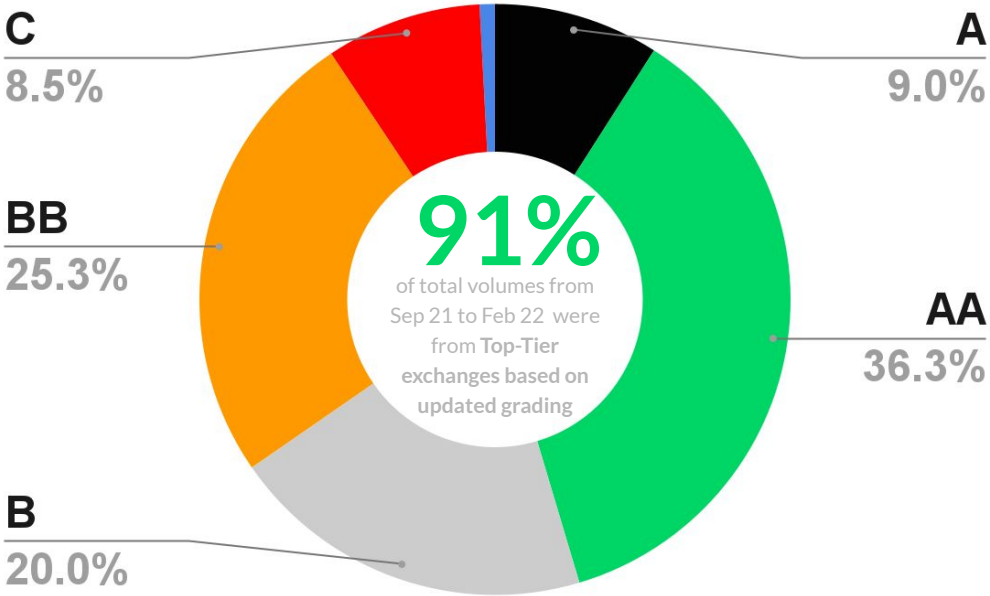
CryptoCompare has established the notion of **Top-Tier volume** whereby investors can segment the market into higher and lower risk volumes.

We currently define Top-Tier volume as volume derived from exchanges scoring a B and above.

This equates to a total of **78 exchanges** (vs 87 in Aug 2021 and 84 in Feb 2021 Benchmark) that we have rated **Top-Tier** for the current review.



Average Monthly Volume per Grade



Market Update and Analysis

Exchange News: Consolidation and Expansion

A number of key themes have come to light over the last 6 months in regards to the development of digital asset exchanges. These include:

Consolidation and Expansion: Various top-tier exchanges have carried out notable acquisitions since August 2021. These include both competitor acquisitions, where we are seeing industry consolidation, and umbrella-acquisitions, where exchanges are expanding into wider areas in the industry.

Exchange	News	Key Takeaway/Theme	Date
FTX	FTX.US to Buy LedgerX in Bid for US Crypto Derivatives	FTX expands to Derivative markets	31 August, 2021
Binance	Binance Labs Participates in the Series C Funding of Mythical Games	Binance expands to GameFi	5 November, 2021
Kraken	Kraken Acquires Staked and Offers a New Way to Earn Crypto Rewards	Kraken expands to DeFi by providing staking services	21 December, 2021
Gemini	Gemini Acquires Trading Technology Platform Omniex, Launches Gemini Prime	Industry consolidation as Gemini expands institutional offering	19 January, 2022
FTX	FTX Buys Crypto Exchange Liquid Group for Expansion in Japan	Industry consolidation as FTX expands into Japan	2 February, 2022
Binance	Binance and Netmarble F&C Sign MoU for Strategic Partnership to Build a Global P2E and NFT Ecosystem	Binance expands into NFTs and GameFi	17 February, 2022

Exchange News: Key Personnel and International Expansion

Key Personnel: Exchanges have started to expand their teams to bring in new personnel who can positively impact their firm and the industry as a whole. This includes adding team members who have regulatory experience or advisors whose expertise can bring value to the firm.

Exchange	News	Key Takeaway/Theme	Date
Binance	Former IRS-CI Special Agent Tigran Gambaryan joins Binance as VP of Global Intelligence and Investigations	Binance appoints key Compliance hire	30 September, 2021
Binance	Former Dubai Financial Services Authority Director Joins Binance as Chief Regulatory Liaison Officer	Binance appoints former Dubai regulatory director	15 October, 2021
Coinbase	Tobias Lütke, CEO of Shopify, to join Coinbase Board of Directors	Coinbase appoints commerce pioneer to its board	31 January, 2022

International Expansion: While most exchanges already operate at an international level, over the last six months many have formally expanded their operations into new territories.

Exchange	News	Key Takeaway/Theme	Date
Crypto.com	Global USD Bank Transfers Are Now Available in 60+ Countries	Crypto.com expands USD bank transfers to 37 new jurisdictions	24 August, 2021
BitMex	BitMEX Expands to Switzerland	BitMex expands to Switzerland	31 October, 2021
Gemini	Gemini to Offer Crypto Trading to Bancolumbia Customers	Gemini expands to Latin America	31 January, 2022
Bitstamp	We Continue Our Global Expansion With New Amsterdam Office	Bitstamp opens an office in Amsterdam	3 February, 2022

Top-Tier Exchanges Gain Market Share

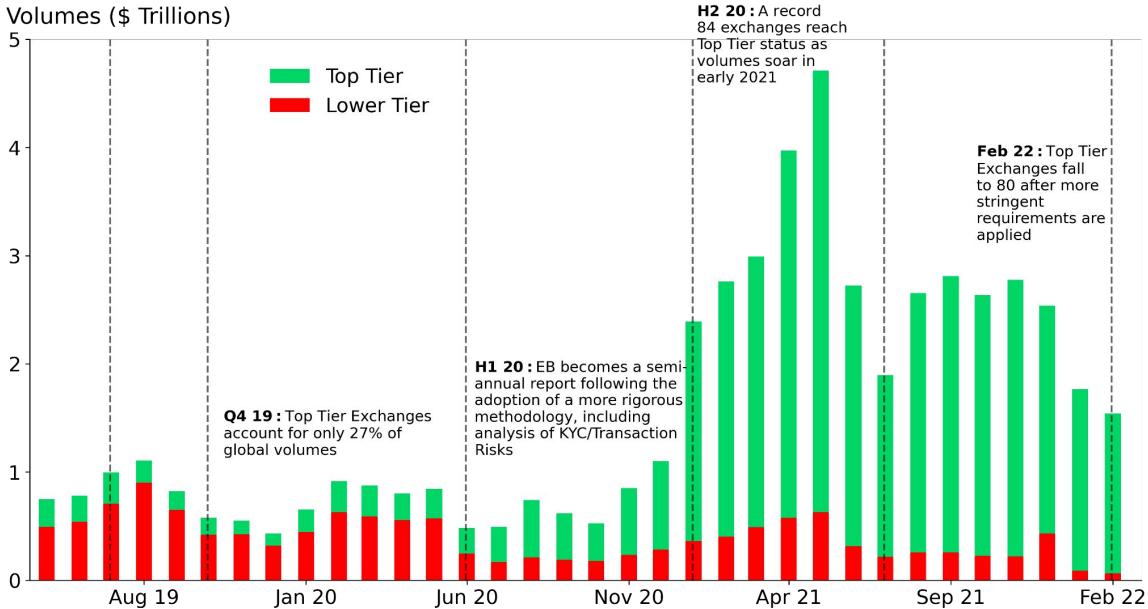
Top-Tier Exchanges Gain a Further 7% Market Share

Top-Tier exchanges have increased their market share from 89% in Aug 2021 (based on Aug 2021 rankings) to 96% in February 2022 (based on the latest Feb 2022 rankings) as both retail and professional traders move to lower risk exchanges. When taking an average over the last 6 months, Top-Tier exchanges account for 88% of digital asset volumes.

Top-Tier exchanges traded a total of \$1.5tn in Feb 2022 compared to \$62bn for Lower-Tier exchanges.

Meanwhile, as a result of improving standards amongst the best exchanges, the count of AA-A exchanges increased from 9 (as of Aug 2021) to 15 (as of Feb 2022)

Historic Top Tier vs. Lower Tier Volumes
Top Tier Volumes reach 96% in February 2022

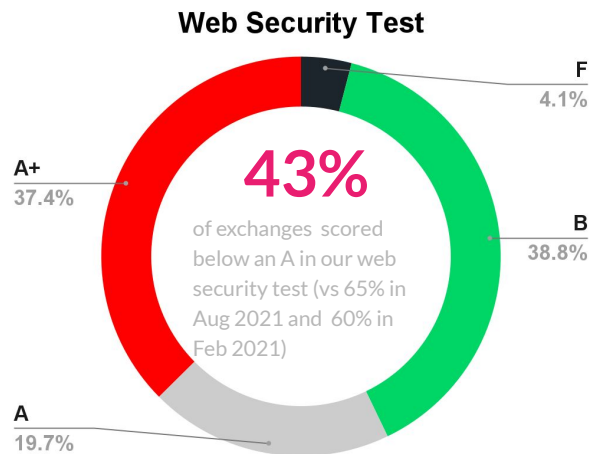


Exchanges Keep up with Regulatory Scrutiny

Over the last 6 months, regulators have started to pay increased attention to the centralised exchange sector within the crypto industry. The EU's commissioner for financial services [cautioned](#) on the growth of the industry and the need for regulatory action, while individual agencies such as the SEC and FCA have expressed similar concerns. Exchanges have reacted to this by sharpening their processes when it comes to security, regulatory risk, and KYC policies.

For example, only 43% of exchanges scored below an A in our web security test, compared to 65% in Aug 21. Similarly, 99% of all assessed exchanges now use 2-factor authentication, compared to 95% in Aug 2021. More and more exchanges now also possess exchange or MSB licenses that will be common practice once stronger regulation is in place. These crypto companies are preparing for the certainty of regulatory changes over the coming years.

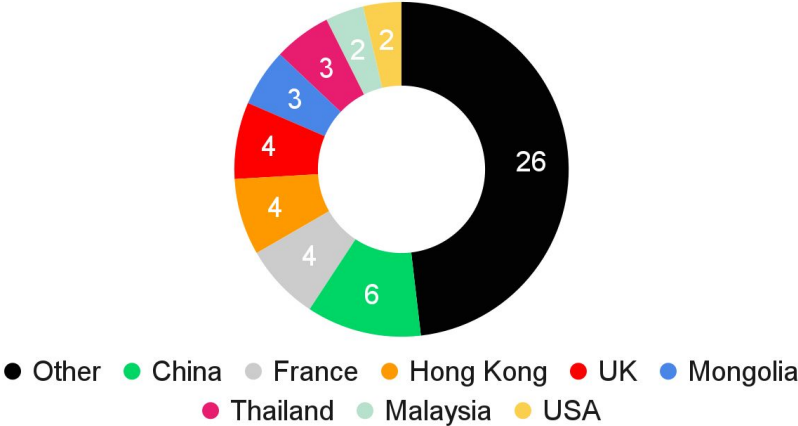
*As regulation continues to develop, **CryptoCompare** will progressively increase the stringency requirements for an exchange to be classified as Top-Tier in line with stronger scrutiny from regulators. Similarly, the requirements needed to achieve an AA or A rating will increase to separate the very best exchanges from the rest of the pack.*



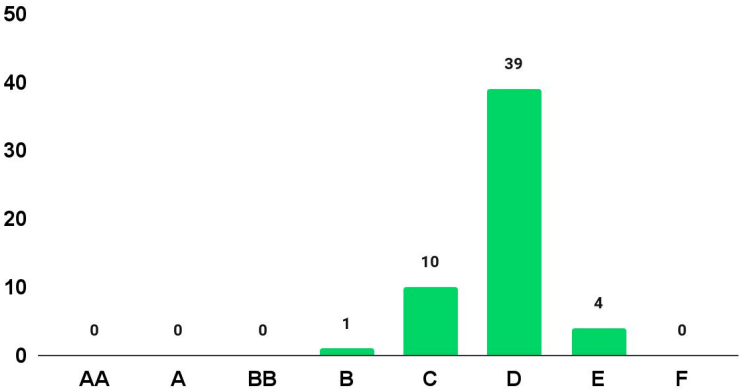
Industry Consolidation: Exchange Closures Since 2019

Since the Exchange Benchmark was released in 2019, the industry has seen extensive consolidation, with top-tier exchanges now dominating trading volumes across the industry. Uncompetitive exchanges have had to shut down - **there has been 54 exchange closures since June 2019**. Most of these exchanges were scattered globally, however Chinese-based exchanges saw the largest amount of closures with 6, primarily caused by the crackdown by the Chinese government on the industry. All but one of the exchanges that closed down were classified as Lower Tier by our Exchange Benchmark.

Shutdowns by Jurisdiction



Number of Exchange Shutdowns by Grade



Changing Exchange Landscape

The consolidation of exchanges has important implications for the future of the crypto industry. As we have seen, volumes have started to become concentrated amongst the top tier exchanges, and this is a trend which is bound to continue into the future. As the industry matures, we expect there to be an oligopoly of exchanges dominating trading volumes as their traction accelerates and smaller players are left behind.

Digital asset exchanges will also play a critical role in shaping the entire industry going forward. Some of the most influential companies and individuals in the industry are exchanges and their figureheads, such as Brian Armstrong from Coinbase and Changpeng Zhao from Binance. These firms will be able to leverage the attention they receive from regulators to lobby for positive regulatory frameworks. According to a [study from Crypto Head](#), Coinbase had the third largest crypto lobbying spend in 2021, after Robinhood and Ripple respectively. These expenditures will undoubtedly grow as more clarity arises from regulators globally.

Having said this, there are still major headwinds for the exchange industry. The recent crisis involving Ukraine and Russia has highlighted the political pressure that exchanges may be subject to going forward - for example, [Hillary Clinton recently criticised](#) exchanges for not banning Russian users from their platforms. While many exchanges have resisted this pressure, this political factor is an important risk to consider for the future of exchanges. Lastly, there is a wide internal movement within crypto for users to withdraw their crypto off exchanges in preference for self-custody. The mantra of “not your keys, not your coins” is growing stronger amid the political pressure received by exchanges, a movement that could hinder the business model of exchanges. This is also a key trend to consider going forward.

Category Stats

Regulation/Legal

3%

of exchanges do not openly reveal the **legal entities** associated with their exchange (vs 5% in Aug 21 and 7% in Feb 2021)

11%

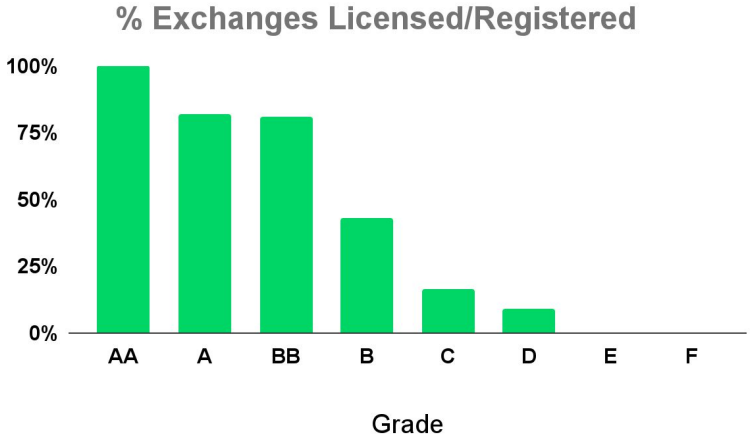
of exchanges formally offer some form of **cryptocurrency insurance** (vs 10% in Aug 2021 and 9% in Feb 2021)

41%

of exchanges are registered as an **MSB** or possess a **crypto exchange license** (vs 36% in Aug 2021 and 37% in Feb 2021)

7%

of exchanges claim to **informally insure** users in the case of breach (insurance fund) - (vs 9% in Aug 2021 and 3% in Feb 2021)



KYC/Transaction Risk

27%

of exchanges use an external **on-chain transaction monitoring** provider (vs 25% in Aug 2021 and Feb 2021)

60%

of exchanges impose **strict ID verification** requirements on users (vs 64% in Aug 2021 and 66% in Feb 2021)

27%

of exchanges were found to send funds to **higher risk entities** for more than 4% (High Risk Range) of transactions according to **CipherTrace** vs 25% in Aug 2021

ONLY 7%

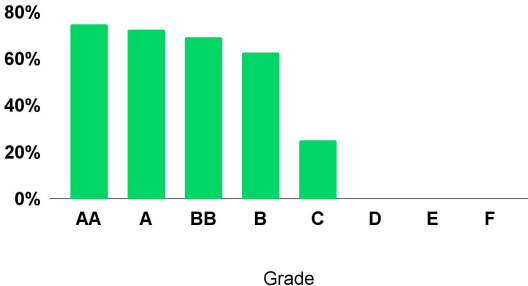
of exchanges formally engage with an external **trade monitoring provider** (vs 6% in Aug 2021 and 5% in Feb 2021)

35%

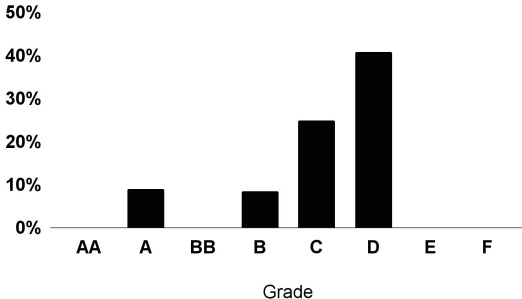
of exchanges were rated as having **poor or inadequate KYC** programs according to **CipherTrace** (vs 34% in Aug 2021 and 33% in Feb 2021)

*For a more detailed explanation of the metrics in the below charts, please see [Page 62: 4. KYC/Transaction Risk](#). These metrics have been sourced using CipherTrace's proprietary risk assessment dataset.

% Exchanges with KYC Procedures rated "Green"



% Exchanges with High Interaction Risk



Security

4%

of exchanges have been hacked in the last year (vs 2% in Aug 2021 and 1% as of Feb 2021)

15%

of exchanges possess an ISO 27001 or SOC2 certificate or similar (vs 13% in Aug 2021 and 11% in Feb 2021)

24%

of exchanges utilise the services of a custody provider to store user assets (vs 23% in Aug 2021 and 18% in Feb 2021)

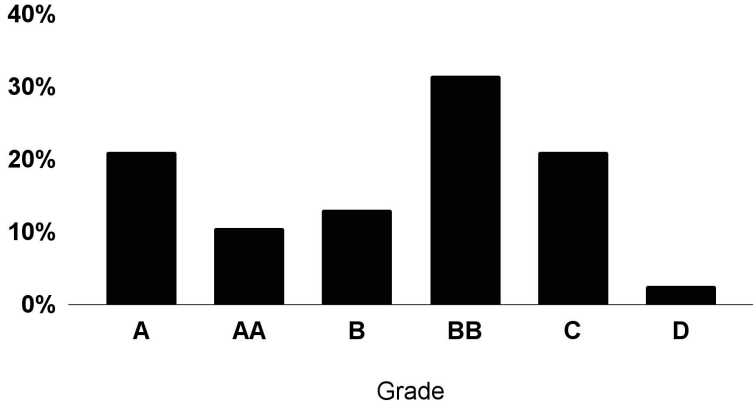
29%

of exchanges state they **hold more than 95%** of crypto in cold wallets (vs 27% in Aug 2021 and 20% in Feb 2021)

99%

of exchanges offer 2-factor authentication (vs 95% in Aug 2021 and 97% in Feb 2021)

% Exchanges that Geographically Distribute Private Keys



Data Provision

71%

of exchanges provide historical candlestick data (vs 68% in Aug 2021 and 53% in Feb 2021)

92%

of exchanges that provide historical candlestick data, offer at least a **minimum of minute granularity** (vs 91% in Aug 2021 and 94% in Feb 2021)

52%

of exchanges offer the ability to **query full historical trade data** via an API endpoint (vs 47% in Aug 2021 and 44% in Feb 2021)

66%

of exchanges **offer a websocket data feed** that users can subscribe to (vs 64% in Aug 2021 and 64% in Feb 2021)

87%

of exchanges offer **at least a level 2 order book** via REST or Websocket connection (vs 80% in Aug 2021 and 81% in Feb 2021)

10%

of exchanges offer a **full level 3 order book** via REST or Websocket connection (vs 7% in Aug 2021 and 10% in Feb 2021)

16%

of exchanges have pushed some form of **error prone data or unannounced updates** via their REST API or Websocket data feeds (vs 15% in Aug 2021)

Transparency, ease of access, and data quality are important foundations for a fair and efficient marketplace

Contact

The Benchmark is backed by thousands of research hours and covers over 80 qualitative and quantitative metrics. Updated twice annually to reflect the fast-changing digital asset landscape, we work hard to ensure the accuracy of all the data comprising the Benchmark. If there is any part of the Benchmark that you would like to discuss, please reach out to us.

Speak to us if you are interested in any of the following:



Custom Reporting



Detailed Benchmark Scores



Underlying Data

CryptoCompare Research

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Get the Benchmark scores using our [API](#)

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Appendix A - Due Diligence Methodology

Qualitative Data Metrics

1. Trading Incentives
2. Security
3. Legal/Regulation
4. KYC/Transaction Risk
5. Team and Company
6. Data Provision
7. Asset Quality/Diversity
8. Negative Events

Data Collection. Qualitative data was collected and/or updated manually between **01 Jan - 11 Feb 2021**. The metrics within each category were collected from a variety of sources, which include but are not limited to: Exchange Websites, LinkedIn Profiles, Crunchbase Profiles, Twitter, Github API Documentation, Companies Houses, Media websites (Coindesk, Bloomberg), and various MSB Registries.

An effort was made to collect each metric as accurately as possible. However, we acknowledge that due to restrictions in terms of public data availability and transparency from certain exchanges, data may be outdated or incomplete. For those who are unhappy with the current ranking, or feel that any data is not up to standard, we are committed to providing the most reliable data set and will ensure that any errors are dealt with quickly and the exchange ranking is updated accordingly. For any such queries, please contact research@cryptocompare.com.

1. Trading Incentives

Exchanges implement various incentive schemes for several reasons, which might include: **attracting additional users** to the platform, **incentivising trading** to drive fee income, and **raising the profile** of the exchange or of certain coins via high volumes to top the volume rankings tables.

Incentive Schemes. In the context of the current study, we have compiled a list of five main **incentive schemes** that we believe encourage additional trading and are often implemented by several exchanges:

- A. Trading Competitions
- B. Airdrops
- C. Transaction-Fee Mining
- D. Zero Transaction Fees
- E. Margin Trading

Inflation Score. The presence of any of these incentive schemes **does not penalise** exchanges in the current ranking system, but only serves as a means of identifying the extent of potential “**volume inflation**” relative to volumes without such models in place. The reason for this is that incentive schemes do not necessarily imply a lower quality exchange. Each metric acts as a flag for “inflated volume” and contributes to a final “inflation score”.

1.A Trading Competitions

Trading competitions are sometimes implemented by exchanges to **attract more users** to the platform and **incentivise trading**. This can help to drive fee income and **raise the profile** of the exchange via volume rankings.

The exchange will reward participants with cryptocurrencies such as BTC or ETH or other lower profile tokens based on their performances in each competition. Bithumb, for example, has implemented a number of events known as “Super Airdrop Festivals” in the past, which have had a clear effect on trading volumes for the duration of each competition.

Competitions vary considerably by structure, and by exchange, and can result in **erratic trading** behaviour. Once a competition is over, **volumes can drop** back to normal levels.

Offering trading competitions does not penalise exchanges in our current ranking system, however their presence is used to flag potential “volume inflation”. We add 5 points to the current “inflation score” if a competition has occurred in the last year. It should be noted that this metric does not serve to detect **current** inflation given that a competition may not necessarily be ongoing, but rather serves as an indication of **potential** and **past inflation** as a result of competitions.

Competitions	Inflation Points
YES	5
NO	0



 Bithumb  @BithumbOfficial 

Super Airdrop Festival STARTS NOW!

Bithumb has invited you to Airdrop Event. Don't miss out and visit [\[bit.ly/2A4YkyG\]](https://bit.ly/2A4YkyG) for details.
 ♡ 29 9:12 AM - Oct 12, 2018

In the top for transaction amount	Reward
Ranked #1 (1 members)	3 BTC
Ranked #2 (2 members)	50 ETH
Ranked #3 (3 members)	4,000 XRP

1.B Airdrops

An airdrop is a **token distribution mechanism** in which free tokens are deposited into a user's wallet (or claimed by users) based on several requirements. Most airdrops are deposited to users based on their holdings of a particular cryptoasset at the time of a designated "snapshot". However, some airdrops are only offered to users provided that they trade a minimum quota of a given market volume per day.

Airdrops can therefore be used as an **incentive mechanism**. We assume that exchanges that enable the airdrops of various tokens - whether as a competition reward or as a promotional event - will **encourage users to trade** on markets they may not have otherwise engaged with, had there not been an airdrop offering.

For this reason, we designate 2.5 "inflation points" to exchanges that offer airdrops. We do not penalise exchanges for the presence of airdrops in our current ranking system.

Offers Airdrop Events	Inflation Points
YES	2.5
NO	0

1.C Transaction-Fee Mining

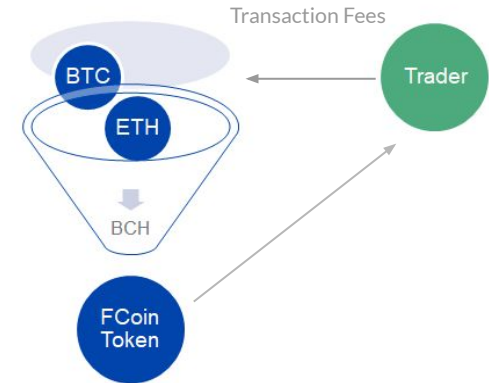
An exchange that implements a transaction-fee mining model will **distribute** their proprietary **exchange token** in **exchange for trading fees**. In other words, they offer up a trading fee rebate, paid back in the form of their own token.

This is very similar to an ICO in terms of structure, as users pay fees in the form of BTC, ETH, USDT etc. and receive a specific quantity of exchange tokens in return.

This trading incentive scheme first rose to prominence in mid-2018 and was used by exchanges such as FCoin, BigONE and CoinBene whose volumes topped exchange volume rankings overnight as a result.

The **more trading** that occurs, the **more tokens can be earned** by individual traders. There is therefore an incentive to trade more, given the particular properties of these tokens.

As a result, this metric is used as an additional proxy for “exchange inflation”. Given the clear impact on volumes that has been seen with this model, exchanges that operate under this model will be assigned an additional **15 inflation points**.



Implements a Transaction-Fee Mining Model	Inflation Points
YES	15
NO	0

1.D Zero Transaction Fees

Several exchanges might implement a zero trading fee model, the ultimate aim of which is to **incentivise additional trading** activity and attract users. With fees eliminated, the costs of trading are effectively eliminated and therefore traders are incentivised to trade more.

It is common for exchanges to offer a zero fee model to market makers, whose presence adds important liquidity to a given market. This effectively makes a market more active and stable. However, for market takers this is far less common. Hence, in our model, **zero transaction fee models refer to fees offered to takers** rather than makers.

Given that transaction fees are eliminated, an exchange must earn revenue by some other means which may include charging listing fees for new coins, offering margin trading and earning interest on leveraged funds, or implementing paid marketing campaigns for certain projects.

In our ranking points system, exchanges are not penalised for offering zero fees. However, a zero fee model will be reflected in a general “trading inflation score” for each exchange.

Implements a Zero-Fee Trading Model	Inflation Points
YES	5
NO	0

1.E Margin Trading

Margin trading is a method of trading cryptoassets using **borrowed funds** provided by a third party.

This enables traders to trade with **much larger sums of capital** such that they are able to leverage their positions and realise larger profits on successful trades. As a result, this tends to **inflate volumes** to levels that would not have been realised had there been no margin trading in place.

Borrowed funds can either be provided by other users on the platform, and in many cases exchanges themselves offer such lending services. This model can offer an additional revenue stream for exchanges that offer particularly low fees and choose to make up the shortfall with interest earned from margin traders.

Margin trading tends to increase the amount of capital that can be traded, as such, overall trading volumes may also be inflated. 5 "inflation score" points were given to exchanges that offer this service.

Offers Margin Trading	Inflation Points
YES	5
NO	0

2. Security

- A. Formal Security Certificate
- B. SSL Rating
- C. Use of a Cold Wallet
- D. % Funds in Cold Wallets
- E. Geographical Distribution of Keys
- F. 2FA
- G. Custody Provider
- H. Regulated and Audited Custodian
- I. Number of Hacks
- J. Any Recent Hacks
- K. Bug Bounty Programs
- L. Institutional/Corporate Offering

Exchanges are key targets for cyber security attacks as they deal with large amounts of sensitive user data, such as private keys, which exchanges must protect. Although security is one area where less transparency can be correlated to greater safety, we have curated a series of high level metrics that we believe help to highlight exchanges that have paid particularly close attention to platform and user security.

2A. Formal Security Certification

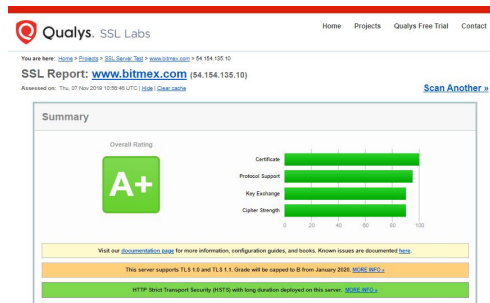
Security Certificate: There are two primary certifications (or attestation standards) we focus on that are used to attest to a company's effectiveness at controlling and protecting the data they use. In North America, this is the [SOC 2](#), which reports on a company's policies relevant to security, availability, processing integrity, confidentiality and privacy. Its purpose is to help ensure that a company has met established security criteria and is adequately protected against unauthorized access.

At an international level, this is the [ISO 27001](#), which is designed to give a best practice framework for implementing an information security management system at an organization. Both standards are internationally recognised. We award 5 points for possessing formal standards and 1.5 points for those in the process of obtaining them.

Formal Security Certification	Security Points
YES	5
IN PROGRESS	1.5
NO	0

2B. SSL Rating

SSL rating: We use the grading system from [Qualys SSL Labs](#) which grades websites' SSL (Secure Sockets Layer) protocol. Where Qualys' rating is not available for any exchange, we use the rating from [ImmuniWeb](#). While the test was not done for all possible IP addresses associated with a given exchange, our points system penalises those with a low score for a single domain, as this alone represents a potential security hole.



SSL Rating	Security Points
A+	3
A	2.5
A-	2
B+	1
B	1
B- and below	0

2C & D. Cold Wallet Storage and Ratio

Offline Storage: Whether an exchange makes use of offline - or 'cold' - storage, widely considered a more secure means of storing cryptoassets (i.e. cryptoasset private keys). Cold storage is considered more secure as keys are siloed away from internet access, with most historical hacks having taken place via hot wallets.

Cold Wallet Ratio: The ratio of an exchange's cold to hot wallets, i.e. how many of its cryptoassets are stored online vs. offline. We assume that the higher the ratio the more secure an exchange. For exchanges that have stated a specific percentage, a scaling factor of 3 has been applied.

For example, if an exchange states 90% of funds are stored in cold wallets, the points awarded will be $0.9 * 3 = 2.7$.

If an exchange states that the majority of funds are in cold wallets, a score of 2 is awarded. If there is some indication that a cold wallet is used, a score of 1 is awarded.

Offline Storage	Security Points
YES	2
NO	0

Offline Storage	Security Points
100% Cold	3
Majority Cold	2
Some Cold	1
No Evidence	0

2E/F. Geographical Key Distribution, 2FA



Geo-Key Distribution: Whether an exchange implements geographical distribution of cryptoasset private keys: we assume that distribution entails greater security. Our assessment is based on the exchange’s own statement of the distribution of keys. We award 1 point for an exchange that distributes its keys.

Geo Distribution	Security Points
YES	1
NO	0

2FA: Whether an exchange offers 2 Factor Authentication for individual account security. 2FA is a widely-recognised security standard which safeguards customer information, we consider an exchange without 2FA to have a serious security flaw. We award 2 points to an exchange for implementing 2FA.

2FA Authentication	Security Points
YES	2
NO	0

2G/H. Custody Provider

Custody Provider: Whether an exchange makes use of an external custody provider to store their cryptoassets. In addition to offering greater security measures, some custody providers such as Bitso, also adhere to ISO 27001 standards.

We assume that in general, the use of a competent custody provider entails a greater standard of security and therefore will score a higher rating. We award 3 points to an exchange that makes use of a custody provider.

Regulated and Audited Custody Provider: Custody providers must be reliable to ensure the security of an exchange. Thus, we measure whether the custody provider used is regulated as a custody provider and whether they are regularly audited by an external auditor. This includes receiving audit certifications including but not limited to SOC 1, SOC 2, and ISO 27001.

Custody Provider	Security Points
YES	3
NO	0

Custody Provider is Regulated	Security Points
YES	1
NO	0

Custody Provider is Audited	Security Points
YES	1
NO	0

2I & J. Hacks

Number of hacks/Recent hacks: This refers to whether an exchange has been hacked in its core infrastructure - with funds or vital information extracted. While some exchanges have had social media accounts compromised, this does not form part of this assessment.

We are aware that exchanges can improve their infrastructure, as such, we focus primarily on the number of recent hacks - i.e. hacks in the last year, that likely came about as a result of failure to implement industry best practices. We also assume the number of hacks to be significant as those that have been hacked more than once have likely failed to respond to weaknesses in their infrastructure.

We deduct 3 points for an exchange with more than 1 hack in the last 2 years, and deduct 5 points if a hack has taken place in the last year.

No. of hacks in 2 years	Security Points
More than 1	-3
NO	0

Hacked Recent	Security Points
YES	-5
NO	0

2K. Bug Bounty Program

Bug Bounty Program: The crypto industry is saturated with talented developers, some of which aim to find vulnerabilities in the security systems of exchanges and other crypto platforms to improve the general safety of the ecosystem. Many exchanges thus operate a bug bounty program to reward developers who spot bugs or other safety vulnerabilities.

Exchanges that operate a bug bounty program are thus **more likely to resolve any safety risks** with the help of the community. We therefore award 2 points for exchanges that operate a bug bounty program, while those who do not will receive 0 points.

This is an area for further exploration - exchanges that provide higher bounties have stronger incentives for developers to report security issues, and thus will likely have stronger security measures. This will be incorporated in the next Exchange Benchmark.

Operates a Bug Bounty Program	Security Points
YES	2
NO	0

2L. Institutional/Corporate Offering

Additional services to Institutional and Corporate Clients: In 2021 it became clear that the crypto industry had began a shift from a purely retail user base to the entrance of institutional and corporate clients. For this reason, various exchanges now offer additional account offerings to best serve these types of clients.

With these additional services comes a more stringent requirement from the side of exchanges in regards to KYC policies and transparency, regulatory frameworks and compliance, and finally security measures. We believe if exchanges offer these additional services they will be better suited to address any risks in these areas, and thus should be rewarded.

Types of Offerings	Security Points
Offers Institutional/Corporate Accounts Only	1.5
Offers Institutional and Corporate Accounts along with Retail offering	1
Offers Institutional or Corporate Accounts, but not both	0.5
Does not offer either Institutional or Corporate Accounts	0

3. Regulatory/Legal

- A. Legal Exchange Name
- B. Country Risk Rating
- C. Country Cryptocurrency Regulation
- D. Country Regulatory Stringency
- E. Registered as an MSB/Licensed
- F. Part of Regulatory/Industry Group
- G. Insurance Against Losses (fiat, crypto, self-insured)
- H. Sanctions compliance statement
- I. PEP compliance statement
- J. Chief Compliance Officer + Experience
- K. Institutional/Corporate Offering

3.A Legal Exchange Name

It is important that the **legal name** of each exchange is available publicly. Firstly, this enables the search of relevant company **documents**, country/regulatory **registrations** and **licenses**. It also allows for **identification of which legal parties** are necessary to file a complaint/legal dispute and who is legally accountable if such an issue arises.

Ultimately, if no legal name can be found it can also be difficult to assess the quality of an exchange, where it is based, or who runs the company.

Therefore, our ranking takes into account whether a legal operating name for each exchange can be found. If so, it is awarded 5 points. If no name can be found, it receives 0 points.

Legal Exchange/Operator Name Found	Points
YES	5
NO	0

3.B Country Risk Rating

A **country risk rating** is a proxy for the **institutional quality** of the jurisdiction in which an exchange is based. It provides an indication of the likelihood of corruption as well as how strong a country's legal systems are. An exchange based in a high quality jurisdiction is subject to the standards and legal structures of that country and therefore exposes users to a lower level of risk.

Country Risk Ratings are calculated using a combination of data from the **World Bank Worldwide Governance Indicators (WGI Ratings)**, **Transparency International**, and **Euler Hermes** Ratings.

The WGI Rating are based on the following six dimensions of governance, which were rescaled to fit a 0-9 scoring format and averaged: "Rule of Law, Regulatory Quality, Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Control of Corruption, Voice and Accountability." Transparency International ratings are a similar proxy for institutional quality by providing a rating of corruption levels in each major country. This was again rescaled to fit a 0-9 format. Euler Hermes ratings measure the financial and other credit risk factors in each major country. We score each country based on the average of the above ratings providers.

Exchanges operate from various jurisdictions. Our assumption is that the quality of a country's institutions will influence exchange standards positively i.e. **higher quality institutions enforce higher standards upon the businesses based there.**

Based on scores 0-9 - we categorise countries into Low Risk, Medium Risk, High Risk, Very High Risk.



World Governance Indicators



THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

Risk	Rating
Low	9
Medium	6
High	3
Very High	0

3.C/D Crypto Exchange Regulation/Regulatory Stringency Rating

Our **cryptocurrency exchange regulation rating** relates specifically to the existence of regulatory frameworks that crypto exchanges fit into. This captures the possibility that certain jurisdictions may contain high quality institutions but may not necessarily impose specific regulatory requirements on crypto exchanges (e.g. sandbox environments).

Exchanges might generally choose to locate themselves in jurisdictions that have clear rules regarding cryptocurrency exchange activity, or in those that generally impose very lax or non-existent regulations. We assume that exchanges based in countries that possess clear regulatory frameworks relevant to cryptocurrency exchanges will generally be a more compliant exchange.

We therefore introduce points scored from 0 to 3 to capture the level of regulation or frameworks that crypto exchanges must meet in order to operate, such as obtaining specific licenses or any registration requirements with regulators.

Regulatory stringency ratings are based on how difficult, in general, it is to receive a license (if applicable), or comply with ongoing reporting or registration requirements in each exchange jurisdiction.

This metric attempts to take into account that certain environments may impose relatively more lenient or stringent regulatory frameworks or licensing requirements in place.

The assumption is that the more difficult the registration/licensing/approval requirements (given existing regulation) for any given exchange, the higher the quality of an exchange. E.g. It is difficult to obtain a BitLicense.

We award points from 0-3, with 3 being difficult to comply with, 2 being moderately difficult, 1 being relatively easy, and 0 being not applicable.

Rating	Basic Criteria
3	Exchanges are regulated, licensed and must register with the relevant regulatory authority. Legislation is comprehensive.
2	Regulatory stance is a grey area, some crypto exchange legislation, and some form of registration/licensing may be required.
1	Relatively unregulated, minimal registration required with financial/regulatory authorities. Minimal/no legislation.
0	No regulation or crypto exchange legislation to be found

Rating	Basic Criteria
3	Difficult
2	Medium
1	Relatively Easy
0	Not Applicable

3.E Registered as an MSB (Money Services Business)

Several exchanges are registered as **Money Services Business (MSBs)**. Although not obligatory in many jurisdictions, exchanges that are registered are normally subject to stricter reporting standards than those that are not.

For instance, those registered with **Financial Crimes Enforcement Network (FinCEN)** must identify ownership roles and controlling stakes within the company, establish a formal Anti-Money Laundering (AML) policy, enforce strict KYC procedures, and file any suspicious activity reports among several other obligations. Those registered with the **Japanese FSA** or the **UK Financial Conduct Authority (FCA)** may have similar reporting obligations.

Although we realise that not all jurisdictions will require this form of registration or may have different standards, we attempt to **reward exchanges that are registered with a regulatory authority** that maintains oversight over exchange activities. We attempt to provide a **general gauge** as to which exchanges have reporting obligations to regulatory authorities over how strict or comprehensive those reporting obligations are at this time. We also note that this metric may be biased in favour of fiat to crypto exchanges, given that crypto to crypto exchanges are generally less exposed to such requirements.

We make the assumption that when exchanges are licenced with a regulatory authority, this is also equivalent to being "registered as an MSB". We do not assume the reverse however.

Ultimately, our main assumption is that exchanges that are **registered as MSB or equivalent**, are imposed to **stricter reporting standards** and **hence higher operational quality**. Exchanges that are registered, regardless of the regulatory authority are designated maximum of 12 points. However we also apply a multiplier (stringency factor from 0-3) to take into account that certain authorities may be more lenient than others.



Registered as an MSB or Equivalent	Points
YES	12 * (stringency factor/3)
NO	0

3.E Licensed Exchanges

Although not required in many jurisdictions, obtaining an exchange license indicates that an exchange must maintain certain reporting, legal and monitoring standards. It also indicates that an exchange is most likely compliant with local regulations.

The **State of New York** requires that cryptocurrency exchanges register with the New York State Department of Financial Services (NYSDFS) to obtain a **BitLicense**. This is contingent upon maintaining specific operational standards and passing various reviews.

Similarly, **Japan** requires exchanges register with the FSA to obtain approval to operate. Other jurisdictions, such as **Estonia**, licenses exchanges via the FIU with a designated license for operating a digital currency exchange.

Not all exchanges must be licensed, however, those that are licensed are assumed to operate under higher standards than those that are not, **i.e. possession of a license is indicative of a higher quality exchange.**

However, not all licenses are made equal. We attempt to differentiate this by implementing regulatory stringency rating multiplier (0-3). Exchanges receive points between 0-12 depending on this factor.



Licensed	Points
YES	12 * (stringency factor/3)
NO	0

3.F Member of Regulatory/Industry Group

Several cryptocurrency exchanges are members of cryptocurrency industry groups. Their respective purposes vary between developing a code of conduct within the industry, assisting in terms of innovation, or offering a form of self-regulation and advice to other cryptocurrency exchanges.

Examples of what we could consider **self-regulatory membership** groups include: Japan's Virtual Currency Exchange Association (JVCEA), Global Digital Finance (GDF) and the Chamber of Digital Commerce. We assume that if an exchange is a member of an SRO (Self-Regulated Organisation), they must conform to certain membership rules and codes of conduct. **2 points** are awarded to exchanges that maintain membership in an SRO

More **general crypto industry groups** include bodies such as the Virtual Commodity Association Working Group (VCA). While membership requirements may not be as stringent as in an SRO, exchanges that are part of these industry groups might participate in order to generally **improve the space**. They are known in the industry and thus assume to be more **transparent**, and they importantly **maintain a code of conduct** within their industry group in order to maintain their member status. **1 point** is awarded when exchanges are a member of **at least one** industry group.



Member of a Self-Regulatory Organisation	Points
YES	2
NO	0

Member of a Cryptocurrency or Blockchain Industry Group	Points
YES	1
NO	0

3.G Insurance Against Losses

Several exchanges offer insurance for certain funds held in custody by the exchange. It is assumed that for exchanges to offer such a service to their customers, they must first prove that they have met certain standards such that they can solicit the services of an insurer. It also serves as a declaration of taking responsibility for unexpected losses that occur on the part of the exchange.

Exchanges that guarantee coverage in terms of lost funds will ultimately expose users to a relatively lower risk service than exchanges that are yet to offer such a service. We consider the offering of such a service to be highly indicative of the quality of an exchange.

We grade exchanges based on two main categories of insurance:

1. Formal cybersecurity insurance for **cryptoassets**
2. **Self-insured** via a "fund" in the case of a hack

We believe that although self-insurance is a way of ensuring clients via their own balance sheet, a public declaration to compensate users in the case of a hack with a pool of funds is one indicator of quality.

We award 3 points for cryptoasset insurance **or** 1 point for a self insurance fund.

Formal Crypto Insurance	Points
YES	3
NO	0

OR

Self Insurance Fund	Points
YES	1
NO	0

3. H/I - Sanctions Compliance/PEP Screening

Sanctions Compliance

It is important when assessing exchange quality to note when exchanges comply with sanctions rules and international recommendations. This will vary from country to country, however the ultimate aim is to state compliance with local regulations and to limit funds entering an exchange from any illicit sources.

Although we are unable to check for compliance via public sources, we assume that at the bare minimum that an exchange that states it has complied with certain country restrictions or UN sanctions lists, indicates at least an intention to comply with certain rules. For this we award **1 point**.

PEP Screening

PEP (Politically Exposed Persons) screening refers to screening for a person who serves or has served in a prominent public function (e.g. government), and by virtue of their position and the influence that they may hold, may present a higher risk for potential involvement in corrupt activity. We therefore consider at least a statement suggesting the intention to screen for PEPs as a positive indication of compliance. We therefore award **1 point** for this.

Sanctions/Country Restrictions Statement	Points
FOUND	1
NOT FOUND	0

PEP Screening Statement	Points
FOUND	1
NOT FOUND	0

3.J Chief Compliance Officer

The compliance officer serves an important function in any cryptocurrency exchange, and helps to ensure that any relevant laws are complied with.

We assume that exchanges with an in-house compliance capacity driven by a chief compliance officer will be more capable of ensuring compliance with regulations and other local laws.

We therefore award **1 point** if we are able to successfully find the relevant staff member.

If this staff member is found, we also attempt to gauge their competence based on the number of years in compliance or legal roles. We award 1 point for 0-2 years, 2 points for 2-5 years, 3 points for 5-10 years and 4 points for more than 10 years.

Chief Compliance Officer	Points
FOUND	1
NOT FOUND	0

Professional Experience	Points
Years = 0	0
$0 < \text{Years} \leq 2$	1
$2 < \text{Years} \leq 5$	2
$5 < \text{Years} \leq 10$	3
Years > 10	4

3K. Institutional/Corporate Offering

Additional services to Institutional and Corporate Clients: In 2021 it became clear that the crypto industry had begun to shift from a purely retail user base to the entrance of institutional and corporate clients. For this reason, various exchanges now offer additional account offerings to best service these types of clients.

With these additional services comes a more stringent requirement from the side of exchanges in regards to KYC policies and transparency, regulatory frameworks and compliance, and finally security measures. We believe if exchanges offer these additional services they will be better suited to address any risks in these areas, and thus should be rewarded.

Types of Offerings	Security Points
Offers Institutional/Corporate Accounts Only	1.5
Offers Institutional and Corporate Accounts along with Retail offering	1
Offers Institutional or Corporate Accounts, but not both	0.5
Does not offer either Institutional or Corporate Accounts	0

4. KYC/Transaction Risk

This category provides an indication of the stringency and effectiveness of KYC procedures, as well as the degree to which exchanges interact with higher risk entities using CipherTrace's proprietary interaction risk scores. An exchange must also be able to detect and monitor suspicious trading activity; we gauge this based on a trade surveillance score.

The 6 metrics used in this category are summarised as follows:

- A. Strict KYC/AML Procedures
- B. On-chain transaction monitoring
- C. CipherTrace KYC Risk Score
- D. CipherTrace Interaction Risk Score (Sent vs Received)
- E. Trade Surveillance
- F. Institutional/Corporate Account Offering



About CipherTrace, a Mastercard company

CipherTrace's anti-money laundering, blockchain analytics, and risk management solutions are powered by advanced cryptocurrency intelligence. Leading exchanges, banks, digital asset businesses, and regulators use CipherTrace to comply with regulation, monitor compliance, and mitigate virtual asset compliance risks.

4.A Strict KYC/AML

As part of most anti-money laundering regulations, it is important that exchanges **identify users** before they are able to trade.

Many exchanges now implement strict **Know Your Customer (KYC) policies** as a means of verifying identity - such that any illicit activity can be monitored and tracked effectively.

As part of our ranking system, exchanges that require identification verification via photo ID before trading is enabled are awarded 5 points, while those that do not are awarded 0 points.

Data collection is based predominantly on terms and conditions pages of various exchanges. If no policy can be found from these pages, the exchange is assumed to implement a policy that does not require identity verification to trade.

Requires Proof of ID to Trade	Points
YES	5
NO	0

4.B On-chain Transaction Monitoring

On-chain transaction monitoring refers to the process of collecting, tracking and analysing transactional flows between cryptoasset addresses on various blockchains.

One of the key functions of on-chain transactional monitoring is to identify and flag any suspicious flows of crypto that may have been derived from illicit sources.

This is critical if a crypto exchange wishes to reduce the chances that any funds flowing to or from the exchange are illicit. By implementing a risk based AML compliance as prescribed by the Financial Action Task Force, EU AMLD5 and US Bank Secrecy Act, exchanges can avoid regulatory exposure and potential enforcement actions.

Given the above, we award exchanges that conduct on-chain transaction monitoring via an external provider such as Chainalysis, Elliptic or CipherTrace with **4 points**. Certain exchanges may have an internal transaction monitoring system to some extent. We award this **2 points**.



Formal Trade Surveillance Provision	Points
YES - EXTERNAL	4
YES - INTERNAL	2
NO	0

4.C Trade Surveillance

Several high profile exchanges have employed the services of **third party trade surveillance providers** to monitor and flag any **suspicious trading activity**. Examples of these providers include Irisium Market Surveillance, Nasdaq SMARTS, Solidus Labs, and NICE Actimize.

In the current exchange ranking model, we make the assumption that exchanges that engage with a formal external market surveillance provider are more **transparent** and able to **detect** and **report** any illicit trading activity, and are therefore of **higher quality in terms of trade monitoring**.

There are exchanges that implemented their own “internal” trade monitoring systems. Given that this process is not conducted ~~as~~ independently, we assume that it is less indicative of quality than a formal system that is independently administered by a known surveillance provider.

For these reasons, we award 5 points to exchanges that implement external formal trade surveillance provision, and 2.5 points to those that have formally stated the use of their own internal monitoring systems. Exchanges that do not explicitly mention any formal trade monitoring system are awarded 0 points.

Formal Trade Surveillance Provision	Points
YES - EXTERNAL	5
YES - INTERNAL	2.5
NO	0

4.D CipherTrace KYC Classification Score

Our ranking awards points to exchanges according to **CipherTrace’s VASP KYC classification** for cryptocurrency exchanges. Our ranking translates CipherTrace’s three-tiered colour system for exchanges into points.

CipherTrace’s global team of compliance experts have opened and actively traded on accounts with over 950 Virtual Asset Service Providers to determine their KYC risk level. They evaluate which exchanges require a very strenuous KYC process, requiring little or no KYC at thresholds and flags that have weak KYC.

A **Green** rating means that a holistic amount of KYC information is required. ID process and proof of address are required, TAX ID number may be required and a phone call or video chat may be required. We award **4 points for a Green rated exchange**.

A **Yellow** rating means that an exchange will allow deposits and withdrawals up to a specified dollar amount with little to no KYC. CipherTrace deems this risky because structuring and account proliferation can allow money laundering to fly under the radar. Larger amounts may require up to a green level of KYC. **We award 2 points for a Yellow rated exchange**.

A **Red** rating means an exchange allows any daily deposit or withdrawal with very minimal to no KYC. Usually this involves just an email address, name and phone number (which may or may not be real). **We award 0 points for a Red rated exchange**.

Ratings are based on data for February 2022.

CipherTrace Classification	Points
Green	4
Yellow	2
Red	0



4.E CipherTrace Interaction Risk Score

Our ranking also awards points to exchanges according to CipherTrace’s Interaction Risk Score, which is broken down into two fields: “**ReceivedHighRiskVolume**” and “**SentHighRiskVolume**”. An overall interaction risk score is formulated by taking into account the % of transactions both **received** and **sent** to higher risk entities over a rolling 12-month window. The latter (sent) can be controlled by the exchange whereas the former cannot - we therefore allocate a higher weighting (80%) to “SentHighRiskVolume” during the final calculation. CipherTrace profiles VASP transactional risk by deanonymizing risky entities and illicit activities to identify criminal sources of funds and money laundering exposure.

These are entities which are:

***Criminal • Dark Market • Dark Vendor • Gambling • High Risk Exchange •
Malware • Mixer • Ransomware • OFAC Sanctioned Addresses***

We award points as follows: an exchange where **0-1.99%** of its transactions are conducted with high risk entities (sent or received), **is awarded 4 points**. An exchange where **2-3.99%** of its transactions are conducted with high risk entities **is awarded 2 points**, and an exchange where **4%** or more of its transactions are conducted with high risk entities is awarded **0 points**.

Ratings are based on data as of February 2022.



CipherTrace Classification (% Transactions Sent or Received to/from High Risk Entities)	Points
Green (0-1.99%)	4
Yellow (2-3.99%)	2
Red (4%+)	0

Transaction RiskScore =
**80% * SentHighRiskVolume Score +
 20% *ReceivedHighRiskVolume Score**

4F. Institutional/Corporate Offering

Additional services to Institutional and Corporate Clients: In 2021 it became clear that the crypto industry had begun to shift from a purely retail user base following the entrance of institutional and corporate clients. For this reason, various exchanges now offer additional account offerings to best service these types of clients.

With these additional services comes a more stringent requirement from the side of exchanges in regards to KYC policies and transparency, regulatory frameworks and compliance, and finally security measures. We believe if exchanges offer these additional services they will be better suited to address any risks in these areas, and thus should be rewarded.

Types of Offerings	Security Points
Offers Institutional/Corporate Accounts Only	1.5
Offers Institutional and Corporate Accounts along with Retail offering	1
Offers Institutional or Corporate Accounts, but not both	0.5
Does not offer either Institutional or Corporate Accounts	0

5. Executive Management & Company Quality

The **calibre of an exchange's executive management team** and their level of **transparency** can be a clear proxy for how well an exchange is managed and its accountability for any problems that may occur. Furthermore, the **age of an exchange** can provide us with a second gauge of infrastructure quality based on the assumption that older exchanges may have had the time to develop a more robust technical and legal infrastructure.

The first two metrics relate to **identity/transparency**, while the subsequent four metrics relate to **team/exchange quality**:

- A. Identity of Executive Team
- B. Post-Graduate/Professional Degrees
- C. Professional Experience
- D. Exchange Age
- E. Investment
- F. Volumes per Staff

The assumption here is that the **more transparent** and **experienced/educated** an exchange's executive team, and the **older** an exchange is, the **higher the quality** of the exchange.

Finally, in order to expand and develop, many cryptocurrency exchanges have attracted **investments** from large well-known venture capital firms or prominent technology companies. We assume that the calibre of an investor can provide us with an indication of the quality of the exchange.

5.A-D Identity of Executive Team, Executive Quality, Exchange Age

Identity of Executive Team: The identity of the CEO, CTO, COO, CFO, CCO and CISO is registered in our data set. If no such title is available, the closest match is noted (e.g. VP of Engineering vs CTO). Those responsible for each position are searched for via company pages and LinkedIn. Each Identity that is found will receive 2 points. Those that cannot be found receive 0 points. The maximum points available is therefore 12 points (6 x 2).

Post-Graduate/Professional Degrees: As a measure of executive quality for each position, those that have attained either a masters-level degree or an additional professional qualification (e.g. CFA) will receive 1 point. Those that have not, will receive 0 points.

Professional Experience: This metric assumes that executives with more experience will be better at their respective roles. For the CEO, we gauge the number of years of experience at manager/director to C-level. For the CTO we gauge the number of years of experience in software related roles. For the CFO/COO we measure the number of years of experience in financial/operational roles respectively. For the chief compliance officer, we measure the number of years in legal or compliance roles. Finally for the CISO, we judge based on the number of years of relevant security/software/IT experience. Points are scored using a threshold system.

Exchange Age: The number of years of operation since launch can provide us with a measure of infrastructure quality based on the assumption that older exchanges may have had the time to develop a more robust technical and legal infrastructure. Ages are measured in years and scored using a tiered system. Older exchanges are scored higher than younger exchanges.

Identity of Exec Member (CEO/CTO/CFO/COO/CCO/CISO)	Points
Found	2
Not Found	0

Post-Graduate/Professional Degree	Points
YES	1
NO	0

Professional Experience	Points
Years = 0	0
0 < Years ≤ 2	1
2 < Years ≤ 5	2
5 < Years ≤ 10	3
Years > 10	4

Exchange Age	Points
Years ≤ 1	1
1 < Years ≤ 3	4
3 < Years ≤ 5	5
5 < Years ≤ 7	7
Years > 7	10

5E. Investment

In order to expand and develop, many cryptocurrency exchanges have attracted investments from large, well-known venture capital firms or prominent technology companies.

We assume that the **calibre of an investor** can provide us with an indication of the quality of the exchange in three ways.

1. High quality investment banks, tech companies or professional VC firms invest in firms that meet a certain standards.
2. VC firms might invest in companies based on a selection of conditions or milestones that must be met moving forward. As a result, exchanges may be required to operate to a certain standard in order to meet these conditions. Effectively, high quality investors might impose their quality standards on exchanges that they invest in.
3. Finally, exchanges that receive investments from prominent investors have larger sums of capital with which to improve their operational and legal standards.

Large Institutional/Professional VC/Prominent Tech Investment. We only award points based on investments from investors that have been operating for a minimum of 5 years and predominantly invest in non-crypto related industries. Exchanges that have received investments from these types of investors are awarded 3 points.

Smaller High Quality Investors. Similar to the above, exchanges that have received investments from smaller well-known investors (VC/tech companies) are awarded 1 point.

For each investment category, if no investors could be found, they receive zero points.

High Quality Investment Large Investor	Points
YES	3
NO	0

High Quality Investment Smaller Investor(s)	Points
YES	1
NO	0

5F. Volumes per Staff

For an exchange to have and sustain extremely high volumes, they typically need to build the necessary infrastructure to manage these volumes. This includes the building of a sufficiently large enough team, as infrastructure and security teams must grow in tandem with trading activity.

Because of this, the volumes per staff score will assess the risk of volumes mismanagement. An exchange with lower staff numbers will likely be a younger exchange, and thus possibly more prone to errors and mismanagement. A high volumes per staff indicates more volumes at stake, but a lack of staff to support it.

Thus, exchanges with a high volumes per staff score will be penalised accordingly, as it suggests a higher risk of the mismanagement of such volumes.

Volumes per Staff	Points
Volumes/Staff < \$10mn	3
Volumes/Staff < \$100mn	2
Volumes/Staff < \$200mn	1
Volumes/Staff > \$200mn	0

6. Data Provision

This section assesses the quality of the API of an exchange. The following metrics were collected:

- A. API Average Response Time (ms)
- B. Ability to Query Historical Trades
- C. Historical Candlestick Data
- D. Granularity of Candlestick Data
- E. Offers Websocket or FIX Connection
- F. Provides Order Book API Endpoint
- G. Maximum Order Book Level Offered
- H. API Rate Limits
 - I. Ease of API Use
 - J. API Data Quality

6.A/B Average API Response Time, Ability to Query Historical Trades

API Response Time: Defined as the average time taken for a user requesting order book data from an exchange’s public REST API endpoint to fully receive the requested data end to end. This was designed to measure the efficiency of an exchange’s infrastructure.

We measure this across all available exchange markets in 10 minute intervals between 31 Jan-11 Feb 2022 where possible.

For high frequency traders, this metric is particularly important as it is critical to have the ability to react to new market information swiftly and to place orders at low latency.

The **lower** the average response time, the **better the rating**. This metric was scored using the basic threshold system on the right.

Ability to Query Historical Trades: refers to whether an exchange offers any public API endpoints that allow users to query for historical trades at any point in the past.

This is an important metric in terms of transparency and accountability as it allows users or authorities to cross-check any calculated values at certain points in time.

Ratings were assigned based based on a YES or NO response. Exchanges that offer the ability to query historical trades were awarded 5 points, while those that do not were awarded 0.

Threshold	Points
$0 < \text{Time} \leq 150$	5
$150 < \text{Time} \leq 400$	4
$400 < \text{Time} \leq 700$	3
$700 < \text{Time} \leq 1000$	2
$1000 < \text{Time} \leq 2000$	1
$2000 < \text{Time}$	0

Ability to Query Historical Trades	Points
YES	5
NO	0

6.C/D Historical Candlestick Data

Availability of Historical Candlestick Data: While not as transparent as providing access to full historical trade data, the provision of historical candlestick data allows for the querying of the historical OHLC data via an API at some level of granularity.

Ratings were assigned based based on a YES or NO response. Exchanges that offer historical candlestick data were awarded 2 points, while those that do not were awarded 0.

Granularity of Candlestick Data: We assume that the more granular the data, the more transparent the exchange, and more competent in terms of data provision. We award 2 points for 1 minute data or less and 1 point for between 1 minute and hourly.

Candlestick Response	Points
YES	1
NO	0

Granularity	Points
1 Min or Less	2
Between 1 Min - Hourly	1
More than Hourly	0

6.E Websocket or FIX Connection

Websocket Connection (WS): A websocket connection provides a standardized way for an exchange server to send data to a user without being first requested by the client (i.e. REST API).

Instead of a client requesting data from an exchange via an API, a user can maintain an open connection that “listens” for data, allowing a stream of data to pass back and forth between the user and the exchange. Websockets are capable of much larger quantities of data transfer and at higher rates than REST APIs.

Ratings were assigned based on YES or NO response. Exchanges that offer a WS connection are awarded 5 points, while those that do not are awarded 0.

FIX Connection: [FIX](#), or Financial Information eXchange is an electronic communications protocol used to exchange securities transaction information. Used by over 300 firms including the major investment banks, it has become the international standard for trade communication and regulatory reporting. This type of connection is similar to a websocket connection.

We consider an exchange that offers FIX to be of higher quality as it demonstrates a superior infrastructure and better integration with existing institutional protocols. We award 5 points for those that offer FIX.

Offers FIX or Websocket?	Points
YES	5
NO	0

6.F/G Order Book API Endpoint

Order Book: An order book contains a list of orders that an exchange uses to record the interests of buyers and sellers. A matching engine uses the order book to determine which orders can be filled.

The provision of an order book API endpoint provides users with the ability to gauge current order book depth, likely pricing consequences and risk of placing a market order at a given time, as well as signs as to where the price might move next. Exchanges that do not offer this endpoint effectively, hide important information regarding the characteristics of a market and how this changes over time.

Ratings were assigned based on YES or NO responses. Exchanges that offer an order book endpoint were awarded 1 point, while those that do not were awarded 0.

Maximum Order Book Level Offered: Providing granular order book data is both an indication of data transparency and technical competence. Level 1 order books refer to just the best bid and ask. Level 2 refers the aggregate orders at each bid and ask position. Level 3 refers to a fully granular order book with non-aggregated positions.

Order Book Endpoint Offered?	Points
YES	1
NO	0

Maximum Order Book Level Available	Points
Level 1	0
Level 2	1.5
Level 3	3

6.H API Rate Limits

API Rate Limits: Exchanges make their data public via an API (Application Programming Interface). Users are able to query data using various API endpoints.

Exchanges will vary in terms of the amount of **data requests per minute** (times a users can query data) they offer publicly to users. If a user exceeds the allocated rate limit (number of maximum requests per API endpoint), they will be unable to access data via the API.

In terms of data provision, exchanges that offer **higher rate limits** per minute are given a **higher score** than those that offer lower rate limits. We award 1 point for between 0 and 100 minutes, 2 points for between 100 and 400 minutes, 3 points for between 400 and 700 minutes, 4 points for between 700 and 1000 minutes, and 5 points for more than 1000 minutes.

Threshold (minutes)	Points
$0 < \text{Rate Limit} \leq 100$	1
$100 < \text{Rate Limit} \leq 400$	2
$400 < \text{Rate Limit} \leq 700$	3
$700 < \text{Rate Limit} \leq 1000$	4
$\text{Rate Limit} > 1000$	5

6.I/J Ease of API Use & Data Quality

Ease of API Use: An API that is well documented, and relatively easy to interpret will lead to fewer data errors. We award exchanges with good API documentation **2 points**.

API Data Quality: Certain exchanges may push likely erroneous (or lack of important) data via their REST APIs or WebSockets. Some may also implement unannounced updates to the ways their APIs are structured or accessed, which can result in erroneous consumption or gaps in data.

In order to highlight this, we rate exchanges on a scale of 1-4. The % of total for this score is then applied as a weighting factor for the entire data provision section. For example, if an exchange scores 2/4 = 50%, they can only score a maximum of 50% of the total Data Provision points.

API Data Quality	Points
Difficult to use, unclear documentation	0
Easy to use clear documentation	2

API Data Quality	Score
two or more distinct and unexpected errors (regular), unplanned maintenance or unannounced changes to API	1
One unexpected error - issue was resolved, otherwise all working fine, api issues are rare	2
No obvious errors - api working smoothly and all changes reported well in advance.	3

7. Asset Quality/Diversity

Asset Quality: This category provides an indication of both the **quality of the assets** listed on the exchange in collaboration with Flipside Crypto. Here we assume that an exchange that provides higher quality assets in general, will pose less of a threat to prospective investors.

The [Fundamental Crypto Asset Score](#) (FCAS™) is a comparative metric used to assess the fundamental health of crypto projects. Each asset is given a score, 0-1000, and an associated letter grade. The score is comprised of three major factors: user activity, developer behavior, and market maturity. Together, they provide a framework to assess an asset's potential for growth.

We rate an exchange on the basis of asset quality, and we calculate the average Flipside Crypto Asset Score (FCAS) of all coins offered on the exchange. We then convert this average FCAS score into points using a threshold system.

Asset Diversity: We also combine this score with an **asset diversity score**, which rates an exchange based on the quantity of assets available. The logic is that a greater number of assets allows an investor to diversify their holdings without needing to spread funds across various exchanges.



Threshold (Average FCAS Score)	Points
>750	5
650 - 750	4
550 - 650	3
450 - 550	2
350 - 450	1
<350	0

Threshold (# of Assets)	Points
>80	5
>30 - 80	4
>15 - 30	3
>5 - 15	2
>1-5	1
1	0

8. Negative Events Penalty

Our Benchmark Methodology also takes into account whether the exchange has experienced a significant negative event in the last year that would indicate a higher level of exchange risk. Since February 2022, this penalty is differentiated in terms of event severity. We particularly look for the following events. Others that may occur are assessed on a case-by-case basis.

- **Data breaches or leaks of private information**
- **Charges/fines following court proceedings**
- **Withdrawal freezes**
- **Arrests/detainment of senior exchange officials**
- **Pending lawsuits or other accusations**
- **Other significant events that reasonably indicate a higher level of exchange risk.**

Depending on the severity of the event, we deduct **up to 5 points** from the total exchange score in the case of a negative event.

Please note that exchange hackings where funds are stolen are not included in this metric because they are captured in our Security Category.

Event Type	Points
Data Breach	-5
Major Charge	-5
Minor Charge	-3
Withdrawal Freeze	-3
Flash Crash	-3
Lawsuit/Accusation	-1
Other (Minor)	-1
Others	Case-by-Case

Appendix B - Market Quality Methodology

Introduction

As part of providing an assessment of exchanges, it is important to also include a representative picture of what trading looks like on their markets.

The metrics defined here are designed to separate exchanges that behave differently from the average exchange. Metrics are converted into ranking scores which are aggregated into the total exchange ranking.

We first present common metrics often used to describe a market, followed by metrics which can be shown to isolate specific unusual trading behaviours.

1. Market Cost to Trade (spread)
2. Liquidity (depth)
3. Stability (volatility)
4. Behaviour Towards Market Movement - (volatility & volume correlation)
5. “Natural” Market Behaviour (standard deviation of volume)
6. Average Monthly Volumes

Data Collection

Pairs	BTC-USD, BTC-USDT, BTC-ETH, BTC-KRW, BTC-JPY ETH-USD, ETH-USDT, and ETH-KRW, ETH-JPY and others.
Time Period	31 January - 11 February 2022
Trade Data	<p>Transaction level data which provides insight into matches between two parties. It is used to calculate minute volatility and to measure an exchange's volume.</p> <p>Collection method: REST API polling on exchanges at exchange rate limits.</p>
Order Book Data	<p>Provides a view of all limit orders (offers to trade) on a particular market at any given moment. It is used to calculate spread and depth.</p> <p>Collection method: REST API polling snapshots and websocket connections when this was not possible.*</p>

*CryptoCompare streams order books for the most notable exchanges via websocket connection; however, for the purposes of this report and to allow for the collection of the broadest data set possible we scaled out using the more widely available REST APIs.

Scoring Market Quality

Comparative

Used when a metric varies greatly between different markets, so we rank each exchange and market combination relative to its peers on a market by pair basis.

Following an ordered sort (direction is specific to each metric), a score of 0-10 is distributed across the group.

$$score(i) = \left\lfloor \frac{10i}{n} \right\rfloor \text{ where } i = \text{position in the list}$$

- Average spread
- 1% depth
- Minute volatility

Threshold

Used when a metric is completely market agnostic, so a threshold can be applied to fairly rank it across any market.

Pearson's correlation is one such measure where we can assign a fixed score to any given value.

- Volatility & volume correlation

Comparative+Threshold

Used when a metric varies greatly between different markets, but also when a logical threshold can be applied.

A threshold might be a fixed figure or one based on a group average or median.

- Standard deviation of trading volume

Each **exchange** receives an **aggregate score** based on an average of the markets we tested.

A Note on Aggregate Scoring

The pairs that were chosen for this report capture the majority of volume of crypto trading, and as such should give a fairly representative picture of exchanges.

A possible implication of focusing on just the specific markets considered in this report is that exchanges whose primary purpose is to cater to a specific jurisdiction (e.g. an exchange whose most liquid trading pairs are in GBP) may appear to have descriptive market metrics which under-represent the true liquidity on these exchanges. These exchanges will not, however, be penalised by other metrics unless the markets show particularly unusual trading behaviour.

1.a Market Cost to Trade - Average Spread

Spread is the difference between the best bid (the highest price at which someone is willing to buy) and the best ask (the lowest price at which someone is willing to sell).

Spreads are tight when markets are liquid. While they may widen in times of volatile price movements, the average spread gives an idea of the liquidity of the market, and quantifies how risky market makers believe the exchange is.

Higher spreads make it costlier to trade and increase market friction.

$$spread = \mathbb{E}(ask - bid)$$

Bid and ask values were collected every 5 seconds (subject to exchange rate limiting) and averaged across Jan 31st to Feb 11th. The long time period used for data collection was chosen to allow for accurate average spread values to be estimated even in the presence of API downtime and differing rate limits.

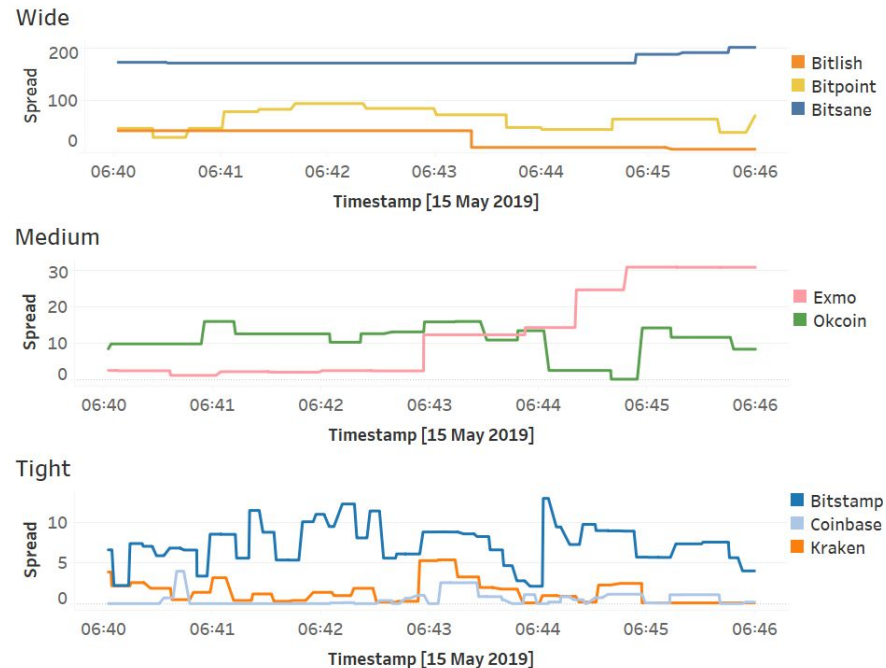
1.b Spread Overview

Generally, those exchanges which offer incentives to provide liquidity through either low or negative maker fees will achieve the tightest spreads.

Due to the spread being calculated using the best bid and offer, it is misleading to use it as a sole gauge of liquidity and therefore as the market cost to trade; it must be used in conjunction with a depth measurement to find the likely transaction price for any given size of transaction.

The spreads on some notable exchanges are shown on the right hand chart to display their variability even on relatively short time horizons (5 mins).

Exchange spreads variability (BTC-USD)



1.c Scoring Average Spread

Define metric

Score across each market

Aggregate

Higher spread = Lower score

Lower spread = Higher score

Comparative

We rank each exchange and market combination relative to its peers on a market by pair basis.

Following an ordered sort (direction is specific to each metric), a score of 0-10 is distributed across the group.

$$score(i) = \left\lfloor \frac{10i}{n} \right\rfloor \text{ where } i = \text{position in the list}$$

Exchange	Market	Metric	Metric Score
Exchange A	BTC-USD	40	0
Exchange B	BTC-USD	28	0
Exchange C	BTC-USD	20	1
Exchange D	BTC-USD	15	1
Exchange E	BTC-USD	12	2
...
Exchange R	BTC-USD	3	8
Exchange S	BTC-USD	2.3	9
Exchange T	BTC-USD	1.5	9
Exchange U	BTC-USD	0.9	10
Exchange V	BTC-USD	0.8	10

Exchange	Markets	Aggregated Metric Score
Exchange B	BTC-USD ETH-USD ETH-BTC	8.4
Exchange C	ETH-USD ETH-KRW ETH-JPY	8.0
Exchange A	BTC-USD BTC-KRW ETH-BTC	6.5
Exchange D	BTC-JPY ETH-BTC	6.2
Exchange E	BTC-USDT ETH-USDT ETH-BTC	5.9

2.a Liquidity - Average 1% Depth

Market depth is the total volume of orders in the order book. It provides an idea of how much it is possible to trade on an exchange, and how much the price is likely to move if large amounts are traded.

An exchange with greater average depth is likely to be more stable (i.e flash crashes are much less likely) and allows trading of greater amounts at better prices.

We consider the depth up to 1% either side of the mid price.

$$depth = \mathbb{E} \left(\frac{depthUp + depthDown}{2} \right)$$

depthUp is the total volume that would be required to move the price by 1% upwards from the mid price, and depthDown is the total volume that would be required to move the price by 1% downwards from the mid price.

2.b Depth Overview

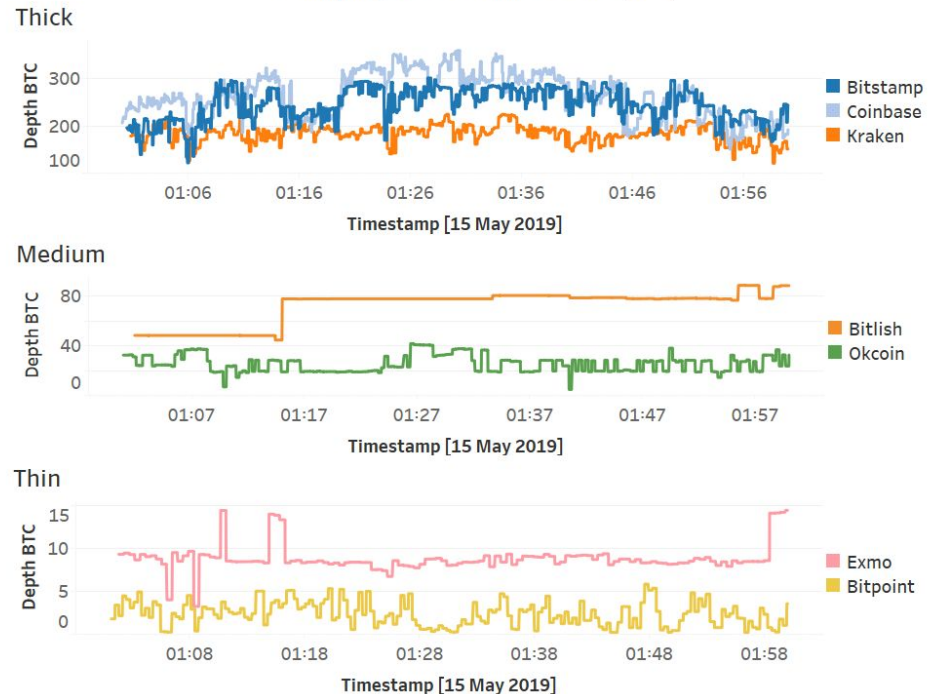
Generally, exchanges which offer incentives to provide liquidity, through either low or negative maker fees, will achieve the deepest order books.

Exchanges that attract the most trading activity will naturally have more orders resting on their book at larger sizes, increasing the depth.

There are stark differences in the depth between exchanges, as shown on the right hand chart. Depth tends to stay relatively constant throughout any given day, but news and other price impacting events can cause sharp changes.

Exchange depth* variability (BTC-USD)

*total liquidity 1% above and below mid price / 2



2.c Scoring Average 1% Depth

Define metric

Score across each market

Aggregate

Less depth = Lower score

More depth = Higher score

Comparative

We rank each exchange and market combination relative to its peers on a market by pair basis.

Following an ordered sort (direction is specific to each metric), a score of 0-10 is distributed across the group.

$$score(i) = \left\lfloor \frac{10i}{n} \right\rfloor \text{ where } i = \text{position in the list}$$

Exchange	Market	Metric	Metric Score
Exchange A	BTC-USD	6	0
Exchange B	BTC-USD	12	0
Exchange C	BTC-USD	16	1
Exchange D	BTC-USD	56	1
Exchange E	BTC-USD	100	2
...
Exchange R	BTC-USD	500	8
Exchange S	BTC-USD	534	9
Exchange T	BTC-USD	611	9
Exchange U	BTC-USD	900	10
Exchange V	BTC-USD	1456	10

Exchange	Markets	Aggregated Metric Score
Exchange B	BTC-USD	8.4
	ETH-USD ETH-BTC	
Exchange C	ETH-USD	8.0
	ETH-KRW ETH-JPY	
Exchange A	BTC-USD	6.5
	BTC-KRW ETH-BTC	
Exchange D	BTC-JPY	6.2
	ETH-BTC	
Exchange E	BTC-USDT	5.9
	ETH-USDT ETH-BTC	

3.a Stability - Minute Volatility

When trading the same asset across exchanges, it is preferable to have lower volatility. Measures of market risk such as the Sharpe ratio use the volatility of an asset - Sharpe ratio is the ratio between excess asset returns and asset volatility.

As we would prefer lower risk when holding an asset on an exchange, we would also prefer lower volatility.

$$volatility = \sigma \left(\frac{price_t - price_{t-1}}{price_t} \right)$$

To calculate the metric, price is bucketed into minutes and the volatility is calculated using the close price of each minute bucket over a rolling 6H period. The volatility is then averaged over the full time period (Oct 5th - Nov 5th).

3.b Scoring Minute Volatility

Define metric

Score across each market

Aggregate

Higher volatility = Lower score

Lower volatility = Higher score

Comparative

We rank each exchange and market combination relative to its peers on a market by pair basis.

Following an ordered sort (direction is specific to each metric), a score of 0-10 is distributed across the group.

$$score(i) = \left\lfloor \frac{10i}{n} \right\rfloor \text{ where } i = \text{position in the list}$$

Exchange	Market	Metric	Metric Score
Exchange A	BTC-USD	0.3	0
Exchange B	BTC-USD	0.18	0
Exchange C	BTC-USD	0.12	1
Exchange D	BTC-USD	0.11	1
Exchange E	BTC-USD	0.10	2
...
Exchange R	BTC-USD	0.04	8
Exchange S	BTC-USD	0.03	9
Exchange T	BTC-USD	0.01	9
Exchange U	BTC-USD	0.009	10
Exchange V	BTC-USD	0.003	10

Exchange	Markets	Aggregated Metric Score
Exchange B	BTC-USD ETH-USD ETH-BTC	8.4
Exchange C	ETH-USD ETH-KRW ETH-JPY	8.0
Exchange A	BTC-USD BTC-KRW ETH-BTC	6.5
Exchange D	BTC-JPY ETH-BTC	6.2
Exchange E	BTC-USDT ETH-USDT ETH-BTC	5.9

4/5 Metrics to Identify Unusual Behaviour

Recent industry focus has centred around highlighting suspicious trading behaviour on exchanges. There has, however, been a shortage of clear and transparent methodologies published for ascertaining whether trading is suspicious for a given market.

We provide a summary of metrics deemed to give a good assessment of whether the trading on an exchange conforms to behaviour that one might generally expect to see. Each of these metrics are designed to single out specific types of trading behaviour.

Behaviour towards market movement - volatility & volume correlation

We analyse the correlation between volume and volatility and use this to provide insights into the types of market participants trading on exchanges, and consider how this differs from the aggregate average.

Natural trading behavior - standard deviation of trading volume

We analyse the standard deviation of trading volumes over different time periods and show that this metric can be used to separate two very different trading behaviours on an exchange.

4.a Behaviour Towards Market Movement

Volatility & volume correlation

The relationship between market volatility and volume can be used to glean an insight into the sorts of trading activity which is being carried out on an exchange.

To explain the modes of trading behaviour seen on exchanges, we define two types of market participants:

- Market makers operate on exchanges, and aim to make a profit while maintaining a market neutral position. They provide liquidity and narrow spreads on a market . Generally, they make money from payments from the exchange, through arbitrage, or on the bid-ask spread.
- Investors are defined here as traders who take a position in the market. They make money based on the price movements of the asset.

4.b An ‘Investor Market’

Investors who take a position in the market are likely to trade more actively in times of volatility.

Price movements may cause limit orders to be filled and new investors will likely join the market to react to price movements.

The end result of this is that volume is positively correlated with price volatility.



4.c A 'Maker Market'

In times of high volatility it becomes less certain that market makers are able to hedge any trade they make effectively.

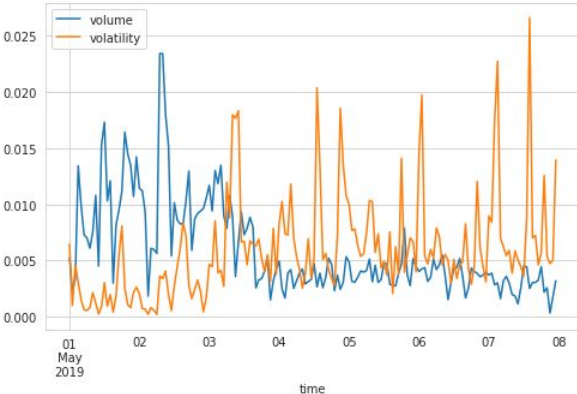
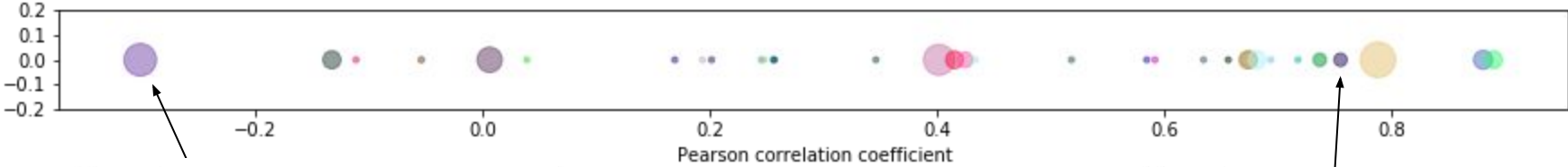
They therefore reduce volumes at each position or increase the spread they are willing to provide for the market. This makes the asset less liquid and means that smaller trades will cause larger price movements.

To avoid large slippage, traders therefore need to trade smaller amounts and the volume becomes negatively correlated to the volatility.

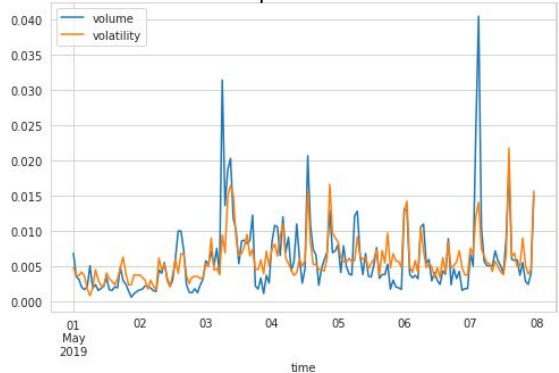


4.d Differentiating Between Types of Market

Taking the Pearson correlation coefficient between hourly trading volume and standard deviation of trade-on-trade return we can separate exchanges which operate with trading in each of these regimes. Size of the marker represents reported trading volume.

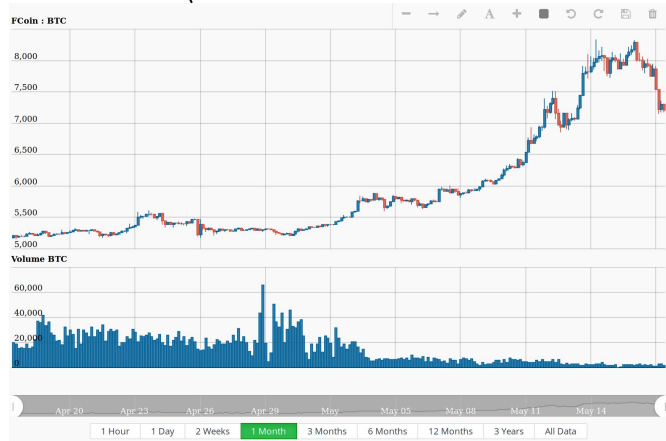
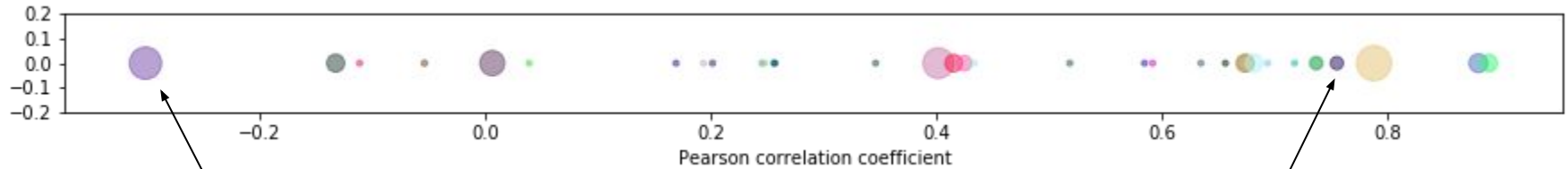


'Maker market'



'Investor market'

4.e Differentiating Between Types of Market



'Investor market'

4.f The Market as a Whole

Both types of behaviour occur in traditional financial markets, but to define what we expect for a cryptocurrency market we turn to a market aggregate.

Here we use the CryptoCompare Index (CCCAGG) as an example of a wide market index. The volume can be seen to correlate with price movements. This is therefore considered to be the preferred behaviour for an exchange.



4.g Scoring Behaviour Towards Market Movement

Volatility & Volume Correlation

Define metric

Score across each market

Aggregate

Low or negative correlation = Lower score

High positive correlation = Higher score

Threshold

A correlation threshold can be applied to fairly rank it across any market.

Pearson's correlation is one such measure which we can assign a fixed score to any given value.

The table on the right sets out the thresholds for each score.

Correlation	Metric Score
≤ 0	0
< 0.12	1
< 0.19	2
< 0.27	3
< 0.35	4
< 0.42	5
< 0.5	6
< 0.58	7
< 0.65	8
< 0.73	9
≥ 0.73	10

Exchange	Markets	Aggregated Metric Score
Exchange B	BTC-USD ETH-USD ETH-BTC	8.4
Exchange C	ETH-USD ETH-KRW ETH-JPY	8.0
Exchange A	BTC-USD BTC-KRW ETH-BTC	6.5
Exchange D	BTC-JPY ETH-BTC	6.2
Exchange E	BTC-USDT ETH-USDT ETH-BTC	5.9

5.a Natural Trading Behavior

Standard deviation of trading volume

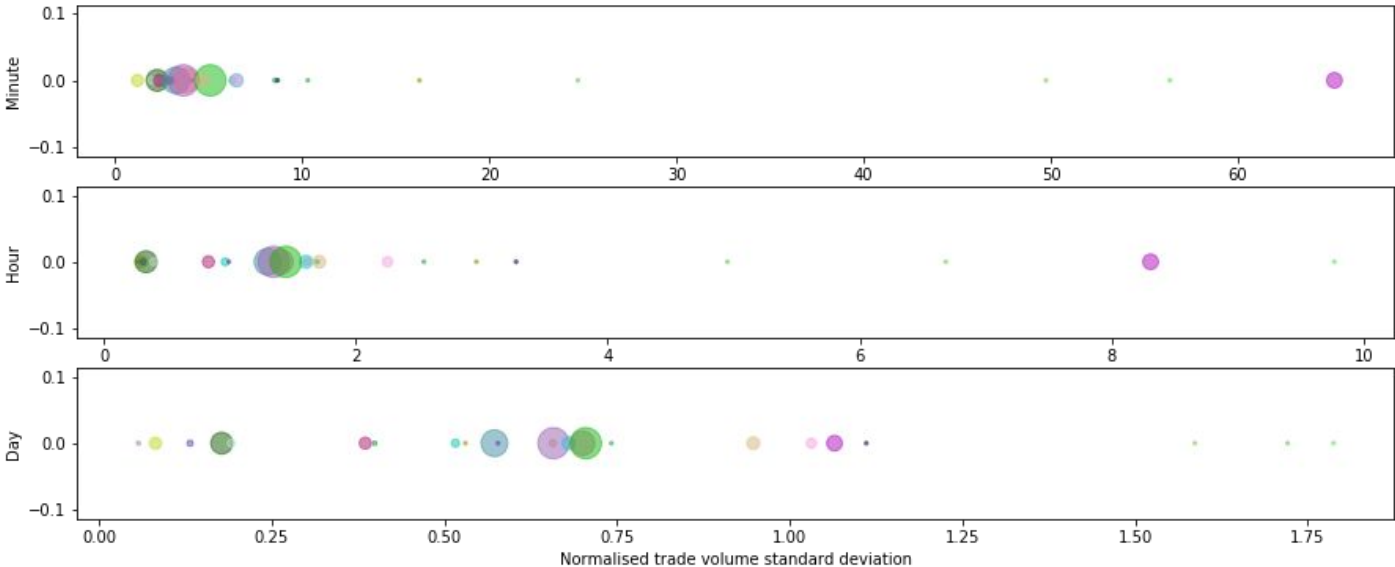
While, as previously discussed, we might expect price volatility to affect trading volume, it is unlikely that in a time of constant price volatility the trading volume would remain constant.

This behaviour is explored by considering how much the minutely, hourly and daily volume vary on average using the standard deviation.

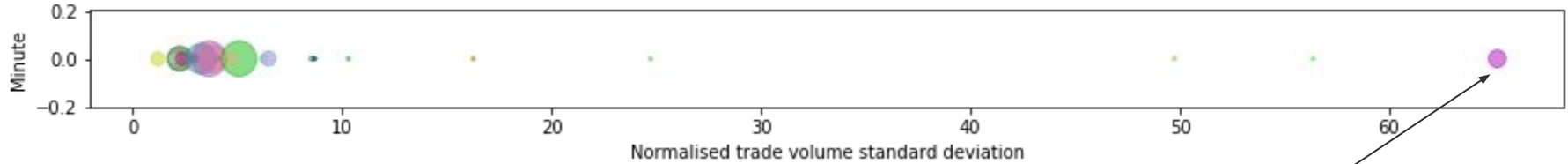


5.b Varying the Time Period

We take the standard deviation of the trading volume over different time periods, and normalise by the mean trading volume for the period.



5.c Small Time Periods

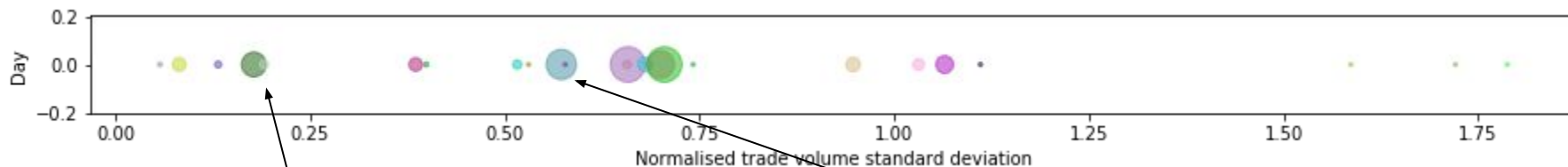


Outliers at small time periods are caused by exchanges which trade very infrequently.



5.d Long Time Periods

Groups at longer time periods (1 day volume) display clear demarcation of the target behaviour.



5.e Scoring Natural Trading Behavior

Standard deviation of trading volume

Define metric

Score across each market

Aggregate

Low standard deviation = Lower score

High standard deviation = Higher score

Comparative + Threshold

Following an ascending sort, a median standard deviation is determined.

Every constituent with a higher standard deviation than the median is given a score of 10.

With the remaining constituents, a score of 0-10 is distributed across the group.

Exchange	Market	Metric	Metric Score
Exchange A	BTC-USD	0.03	0
Exchange B	BTC-USD	0.09	1
Exchange C	BTC-USD	0.10	2
Exchange D	BTC-USD	0.13	3
...
Exchange K	BTC-USD	0.43	10
...
Exchange S	BTC-USD	0.71	10
Exchange T	BTC-USD	0.81	10
Exchange U	BTC-USD	0.85	10
Exchange V	BTC-USD	0.91	10

Exchange	Markets	Aggregated Metric Score
Exchange B	BTC-USD ETH-USD ETH-BTC	8.4
Exchange C	ETH-USD ETH-KRW ETH-JPY	8.0
Exchange A	BTC-USD BTC-KRW ETH-BTC	6.5
Exchange D	BTC-JPY ETH-BTC	6.2
Exchange E	BTC-USDT ETH-USDT ETH-BTC	5.9

6. Average Monthly Volumes

We calculate the average volumes per month using volumes data over the last 6 months for all exchanges. For this edition of the Benchmark, volumes figures have been taken from September 2021 to February 2022.

Average Monthly Volumes	Points
> \$10bn	5
\$5bn - \$10bn	4
\$1bn - \$5bn	3
\$500mn - \$1bn	2
\$100mn - \$500mn	1
< \$100mn	0

Appendix C - Points and Grading Summary

Points Categories

- A. Legal/Regulatory Assessment
- B. KYC/Transaction Risk
- C. Security
- D. Team/Exchange
- E. Data Provision
- F. Asset Quality/Diversity
- G. Market Quality
- H. Negative Events (penalty factor)
- I. Inflation Score (*not used in ranking)

Points Category A - Legal/Regulation

A. Legal/Regulation	Scoring
Legal Company Name	Found: 5, Not Found:0
Registered as an MSB or Licensed as a CryptoCurrency Exchange	YES: 12 x Compliance Stringency Factor [0-3]/3* , NO: 0
Geography Country Rating	Low Risk: 9, Medium Risk: 6, High Risk: 3, Very High Risk: 0
Country Regulation Rating	Crypto Exchange Regulation: [0-3]
Part of Self-Regulatory Organisation	YES: 2, NO: 0
Part of Industry Group	YES: 1, NO: 0
Crypto Insurance Against Losses OR	YES: 3, NO: 0
Self-Insurance Fund	YES: 1, NO: 0
CCO (Chief Compliance Officer)	Found: 1, Not Found: 0
CCO Experience (in Compliance or Legal Roles)	Years = 0: 0, 0 < Years < 2: 1, 2 < Years < 5: 2, 5 < Years < 10: 3, Years > 10: 4
Sections Compliance Statement	YES: 1, NO: 0
PEP Statement	YES: 1, NO: 0
Institutional/Corporate Offering	ONLY: 1.5, BOTH: 1, ONE: 0.5, NEITHER: 0
Total Legal/Regulatory Points	0-43.5
Re-Scaled Legal Points Available	17.5%

Points Category B - KYC/Transaction Risk

KYC/Transaction Risk	Scoring
Strict KYC/AML (proof of ID)	YES: 5, NO: 0
On-chain transaction monitoring	YES: 2, NO: 0
On-chain transaction monitoring - Internal of External Provider	INTERNAL: 0, EXTERNAL: 2
CipherTrace KYC Score	RED: 0, YELLOW: 2, GREEN: 4
CipherTrace Interaction Risk Score	ReceivedHighRiskVolume: 0-1.99%: 4, 2-3.99%: 2, 4%+: 0 SentHighRiskVolume: 0-1.99%: 4, 2-3.99%: 2, 4%+: 0 Aggregate Interaction Risk Score = 80% * SentRiskScore + 20% * RecievedRiskScore (0-4)
Market Surveillance System	YES: 2, NO: 0
External/Internal (if YES to above)	External:3, Internal: 0.5
Institutional/Corporate Offering	ONLY: 1.5, BOTH: 1, ONE: 0.5, NEITHER: 0
Total KYC/Transaction Risk Points	0-23.5
Re-Scaled KYC/Transaction Points Available	15%

Points Category C - Security

Security	Scoring
Formally Certified and Compliant with Security Industry Standard (E.g. ISO 27001, SOC2)	YES: 5, NO: 0
SSL Security Rating by Qualys or ImmuniWeb	A+ =3, A=2.5, A-=2, B+ or B=1, <B-=0
Offline Storage (Cold Wallet)	YES: 2, NO: 0
Cold Wallet %	Cold Wallet % * 3 (weighting factor) , "Majority": 2, "Some": 1, Not Found: 0
Geographical Key Distribution	YES: 2, NO: 0
2FA	YES: 2, NO: 0
Custody Provider (E.g Bitgo)	YES: 3, NO: 0
Regulated Custody Provider	YES: 1, NO: 0
Audited Custody Provider	YES: 1, NO: 0
Number of Hacks in Last 2 Years	More than 1: -3, Less than 2: 0
Hacked Recently	Yes: -5, No: 0
Bug Bounty Program	Yes: 2, No: 0
Institutional/Corporate Offering	ONLY: 1.5, BOTH: 1, ONE: 0.5, NEITHER: 0
Total Security Points	0-24.5
Re-Scaled Security Points Available	15%

Points Category D - Team/Exchange

Team/ Exchange	Scoring
CEO/CTO/CFO/COO/CCO/CISO *Repeat for each executive	Found: 2 Not Found: 0 (12 Total Max)
CEO/CTO/CFO/COO/CCO/CISO Masters or Postgraduate Certification *Repeat for each executive	YES: 1 , NO: 0 (6 Total Max)
CEO/CTO/CFO/COO/CCO/CISO *Repeat for each executive For CEO: director to c-level For CTO: software roles For CFO: financial/accounting roles COO: operations roles CCO: compliance/legal roles CISO: software roles	Years = 0: 0 0 < Years < 2: 1 2 < Years < 5: 2 5 < Years < 10: 3 Years > 10: 4 (24 Total Max)
Exchange Age Since Launch	Months < 12: 1 12 < Months < 36: 3 36 < Months < 60: 5 60 < Months < 84: 7 Months > 84: 10
Volume per Staff Member	Volume/ staff < \$10mn 3 \$10mn < Volume/ staff < \$100mn 2 \$100mn Volume/ staff < \$200mn 1 \$200mn < Volume/ staff 0
Total Team/ Exchange Points	0-55
Re-Scaled Team/Exchange Points Available	15%

Points Category E - Data Provision

Data Provision	Scoring
API Average Response Time (ms)	0 < Time < 150: 5 150 < Time < 400: 4 400 < Time < 700: 3 700 < Time < 1000: 2 1000 < Time < 2000: 1 2000 < Time: 0
Ability to Query Historical Trades	YES: 5 , NO: 0
Historical Candlestick Data	YES: 1 , NO: 0
Minimum Candlestick Data Granularity	=<1min = 2 1min - 1hour: 1 >1hour: 0
Offers Websocket or FIX Connection	YES: 5 , NO: 0
Provides Order Book API Endpoint	YES: 1 , NO: 0
Maximum Order Book Level	L1= 0 , L2= 1.5 , L3= 3
API Rate Limits	0 < Rate Limit < 100: 1 100 < Rate Limit < 400: 2 400 < Rate Limit < 700: 3 700 < Rate Limit < 1000: 4 Rate Limit > 1000: 5
Ease of API Use	Clear Documentation: 2 , Unclear Documentation: 0
API Data Quality (Weighting Factor)	(1 - 4)/4
Total Data Provision Points Available	29 * API Data Quality Weighting Factor (0.25-1)
Re-Scaled Data Provision Points Available	15%

Points Category F - Asset Quality/Diversity

Asset Quality/Diversity	Scoring
FCAS Asset Quality Score	750 < Score: 5 650 < Score < 750: 4 550 < Score < 650: 3 450 < Score < 550: 2 350 < Score < 450: 1 350 > Score: 0
Asset Diversity Score	80 < Assets: 5 30 < Assets < 80: 4 15 < Assets < 30: 3 5 < Assets < 15: 2 1 < Assets < 5: 1 1 Asset: 0
Total Data Provision Points Available	(0.75 * FCAS Asset Quality Score) + (0.25* Asset Diversity Score)
Re-Scaled Asset Quality/Diversity Points Available	5%

Points Category - Market Quality

Market Quality	Scoring
Market cost to trade (average spread)	0-10
Liquidity (average depth of 1% price impact)	0-10
Stability (minute volatility)	0-10
Behaviour towards sentiment (volatility and volume correlation)	0-10
Natural trading behaviour (volume standard deviation)	0-10
Average Monthly Volumes	> \$10bn : 5 \$5bn - \$10bn: 4 \$1bn - \$5bn: 3 \$500mn - \$1bn: 2 \$100mn - \$500mn: 1 < \$100mn: 0
Total Market Quality Points	Average of the 5 scores + Average Monthly Volumes (15)
Re-Scaled Market Quality Points Available	20%

Points Category G - Negative Events

Negative Events	Scoring
Negative Event	Data Breach, Major Charge: -5 Minor Charge, Withdrawal Freeze, Flash Crash: -3 Lawsuit/Accusation, Other (Minor): -1 Others: Case-by-Case basis None: 0
Total Negative Event Points	-5
Re-Scaled Negative Events Points Available	-5%

Methodology Overview - Aggregation and Grading

Scores from each category are aggregated to form a total cumulative score. The **maximum score is 100**.

Minimum Threshold for AA-A Status

To ensure that only the lowest risk exchanges achieve AA - A status, we have created minimum thresholds across certain categories. For KYC/Transaction Risk, Security, Team/Exchange, Asset Quality/Diversity and Legal/Regulatory categories, exchanges must score 60% or above. For Market Quality, exchanges must score 50% or above. If an exchange has received a negative penalty, they have not met that threshold. In addition, exchanges must achieve green KYC and interaction risk scores in line with CipherTrace transaction risk data.

If an exchange breaches one threshold, the maximum grade they can achieve drops from AA to A. If two thresholds are breached, the maximum grade possible is a BB.

Category	Maximum Points	Minimum Threshold for AA-A Status
Security	17.5	10.5 (60%)
Legal/Regulation	17.5	10.5 (60%)
KYC/Transaction Risk	15	9 (60%)
Team/Company	10	-
Data Provision	15	-
Asset Quality/Diversity	5	3 (60%)
Market Quality	20	10 (50%)
Negative Penalty	-5	0
Total Cumulative Points Available	100	

Threshold	Grade
Above 75	AA
70-75	A
60-70	BB
45-60	B
35-45	C
20-35	D
10-20	E
<10	F