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IEEE Standard for General Requirements for Cryptocurrency Exchanges

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IEEE Consumer Electronics Society

Developed by the
Blockchain Standards Committee

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IEEE

IEEE Standard for General Requirements for Cryptocurrency Exchanges

Developed by the

Blockchain Standards Committee
of the
IEEE Consumer Electronics Society

Approved 24 September 2020

IEEE SA Standards Board

Abstract: Self-discipline and professional ethics of cryptocurrency exchange platforms, as well as relevance between them and to cryptocurrency wallets are covered in this standard. Exchange business logic, operational procedures, user authentication programs are also covered in this standard. In addition, a small but necessary technical category of requirements, including terminologies, basic architectural framework, key indicators, end-user interface specifications, in order to achieve the previously mentioned goals is covered in this standard.

Keywords: cryptocurrency, exchange, IEEE 2140.1, self-discipline, transaction

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Introduction

This introduction is not part of IEEE Std 2140.1–2020, IEEE Standard for General Requirements for Cryptocurrency Exchanges.

This standard involves multiple aspects, including self-discipline and professional ethics of cryptocurrency exchange platforms, the exchanges' business logic and necessary technical requirements.

Contents

IEEE Standard for General Requirements for Cryptocurrency Exchanges

1. Overview

1.1 Scope

This standard involves multiple aspects, including self-discipline and professional ethics of cryptocurrency exchange platforms, as well as relevance between them and cryptocurrency wallets. This standard also describes the exchanges' business logic, operational procedures, and user authentication programs. In addition, this standard provides a small but necessary number of technical requirements, including terminologies, basic architectural framework, key indicators, end-user interface specifications, in order to achieve the previously mentioned goals.

1.2 Purpose

Unlike standalone technical normative standards, this standard focuses on reaching a consensus from a business perspective, especially with the aim of protecting consumer rights in cryptocurrency exchange. The adoption of a unified approach promotes quality of service, transparency, fairness, and security with the goal of developing a cooperative and healthy ecosystem for the cryptocurrency market.

1.3 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (shall equals is required to).[1,2]

The word *should* indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (should equals is recommended that).

The word *may* is used to indicate a course of action permissible within the limits of the standard (may equals is permitted to).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (can equals is able to).

[1]The use of the word *must* is deprecated and cannot be used when stating mandatory requirements, *must* is used only to describe unavoidable situations.
[2]The use of *will* is deprecated and cannot be used when stating mandatory requirements, *will* is only used in statements of fact.

2. Definitions, acronyms, and abbreviations

2.1 Definitions

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause. [3]

deposit: the process in which users put cryptocurrency assets into the cryptocurrency exchanges.

GA secondary authentication service: the service by which the user performs the second authentication using the one-time password provided by Google Authenticator after the account password authentication.

matchmaking: the process in which the cryptocurrency exchanges matches the orders of two or more users. For example, if Alice places an order to sell 1 bitcoin (BTC) at the price p1 and Bob places an order to buy 1 BTC at the price p1, the cryptocurrency exchanges matches orders to complete the transaction.

node: refers to the on-chain node of the blockchain, which will save part or all of the contents of the blockchain ledger.

order: the command of buying and selling issued by the user.

order cancellation: the process in which users cancel/withdraw orders to buy and sell cryptocurrency.

order submission: the process in which users submit/place orders to buy and sell cryptocurrency.

order submission and cancellation throughput peak: the maximum throughput of the two actions of submitting and cancelling orders that can be completed by the cryptocurrency exchanges.

stop-loss order: an order that is automatically sold after the cryptocurrency price reaches a specified price (usually lower than the current price). When the specified price is reached, the stop-loss order becomes a market order.

take-profit order: an order that is automatically sold after the cryptocurrency price reaches a specified price (usually higher than the current price). When the specified price is reached, the take-profit order becomes a market order.

token order: the orders which users manually place through normal login.

wallet: the blockchain wallet, which is a tool to store the private key of encrypted assets.

withdraw: the process in which users take cryptocurrency assets from the cryptocurrency exchanges.

2.2 Acronyms and abbreviations

API	application programming interface
APP	application
BTC	bitcoin
KPI	key performance indicator
KYC	Know Your Customer

[3] *IEEE Standards Dictionary Online* is available at: http://dictionary.ieee.org. An IEEE Account is required for access to the dictionary, and one can be created at no charge on the dictionary sign-in page.

P50 50% of orders completed

P95 95% of orders completed

3. Cryptocurrency exchanges self-discipline and professional ethics

3.1 Compliance and order

Cryptocurrency exchanges and practitioners are required to abide by the laws of the countries where they are located and the regulations governing cryptocurrency business.

Cryptocurrency exchanges shall not carry out active or enticing advertising to users without holding a regional compliance license.

The cryptocurrency exchanges shall not misappropriate user assets in the cryptocurrency exchanges wallet without permission.

Practitioners of cryptocurrency exchanges are not allowed to participate in the trading activities of security tokens without reporting to their company.

3.2 Independence and objectivity

Practitioners shall remain objective and neutral and try to avoid participating in the internal governance and external publicity of blockchain projects.

Practitioners shall not provide, solicit, or accept any gift, benefit, compensation, remuneration or other improper benefit agreement that may be deemed to impair the independence and objectivity of the individuals or others.

Practitioners shall not privately give investment advice to users or promise any benefits for the purpose of key performance indicators (KPIs) or improper interests.

Cryptocurrency exchanges and practitioners shall not provide users with concluding comments on the rise or fall of cryptocurrency prices.

3.3 Integrity and responsibility

3.3.1 Responsible to users

Cryptocurrency exchanges and practitioners must accurately execute user instructions and keep private information of previous, current and potential users confidential, unless one or more of the following is true:

a) The information involves illegal activities of users or potential users.

b) Disclosure is required by law.

c) Users or potential users have permitted to disclose this information.

Cryptocurrency exchanges and practitioners shall not sell users' private data at any time.

Cryptocurrency exchanges and practitioners shall actively fulfill their responsibilities to users and protect user interests.

Cryptocurrency exchanges and practitioners shall provide users risk tips (e.g., risk self-assessment, continuous risk appetite survey) and user education.

3.3.2 Responsible to the company and industry

Practitioners shall obey management and leadership and consciously maintain the normal order in cryptocurrency transactions.

Cryptocurrency exchanges and practitioners shall raise their vigilance and supervision awareness and take the initiative to stop unreasonable and non-compliant operations in the industry.

3.4 Professional degree

Cryptocurrency exchanges shall provide corresponding training and education opportunities for practitioners to increase the levels of their professional competence and ethics.

Practitioners shall strive to study the business to improve their professional skills and work efficiency.

Cryptocurrency exchanges and practitioners shall record and save relevant data such as exchange transaction data, operation data, and user information according to corporation, industry, and national policy and regulations.

3.5 Market reputation

Cryptocurrency exchange practitioners shall not take advantage of “inside” or “material non-public” information when trading cryptocurrency.

Cryptocurrency exchange practitioners shall not knowingly take advantage of a corporate opportunity of the Client for personal benefit.

Cryptocurrency exchanges and practitioners shall not take the initiative to manipulate the market or cooperate with relevant parties in market manipulation

Cryptocurrency exchanges shall not falsify data such as trading volume.

4. Cryptocurrency exchanges business model

4.1 Business logic

The business scope of cryptocurrency exchanges may include legal tender–cryptocurrency trading or cryptocurrency–cryptocurrency trading. For the legal tender–cryptocurrency trading business, the cryptocurrency exchanges generally hold related licenses required in the region so as to earn trading fees and other fees to make profits. For the cryptocurrency–cryptocurrency trading exchange business, the cryptocurrency exchange generally provides users with cryptocurrency matchmaking services and peer-to-peer matchmaking services that earn fees, such as trading fees, and are subject to local regulations. The cryptocurrency exchange needs to provide users with stable and smooth trading matching services and protect user's asset security and data privacy.

4.2 Operational procedures

As described in Figure 1, the operational procedures of cryptocurrency exchanges shall include at least the following basic steps: when the users submit the registration, the cryptocurrency exchanges shall identify the users according to the relevant Know Your Customer (KYC) requirements, reject the user registrations that

do not meet the KYC requirements, and authorize the users different withdrawal and transaction permissions according to the level of completion of KYC. At the same time, the cryptocurrency exchanges shall maintain information disclosure and user service in the whole operation process.

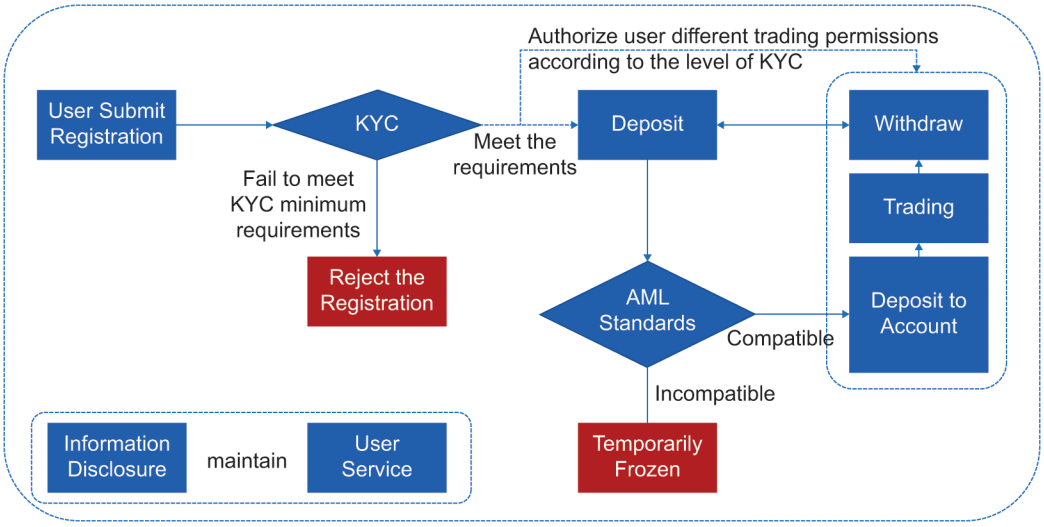

Figure 1—Diagram of the cryptocurrency exchanges operational procedures

4.3 User authentication

Cryptocurrency exchanges shall implement the corresponding KYC specifications in accordance with local regulatory regulations. When there is no clear KYC specification, a multi-level KYC system can be adopted. The higher the KYC level, the higher the authority, which is further explained in the example in Table 1.

Table 1—Example of multi-level KYC

KYC level	KYC contents	Account permissions
0-level KYC	Use e-mail/mobile number for registration	Limited daily token deposit and withdrawal, extremely limited legal tender transactions
1-level KYC	Use e-mail/mobile number for registration + Real-name authentication	General daily token deposit and withdrawal, general legal tender transactions
2-level KYC	Use e-mail/mobile number for registration + Real-name authentication + Face recognition	Large daily token deposit and withdrawal, general legal tender transactions

5. Cryptocurrency exchanges technical framework

5.1 The infrastructure

The basic technical framework of cryptocurrency exchange includes the front end, the trading module, the deposit and withdrawal module, the wallet module, the risk control system, etc., that allow users to use the exchange easily, efficiently and safely.

The front end of an exchange usually includes the Web end, application (APP), and the PC end, providing users with a simple and visual trading interface. The transaction module, as the basis of matching transactions, includes the order system, the matching system, and the clearing and settlement system. The deposit and withdrawal module and the wallet module provide necessary services which enables users to better deposit and withdraw cryptocurrencies as well as manage their assets. The risk control system is a component that must be

included in the technical framework of an exchange, which is used to give early warnings and restrictions to reduce the possibility of loss of user assets. In the Annex A, the technical framework of a centralized matching exchange is given. In addition to the abovementioned modules, it also includes the modules of user center (including account system, registration management and user information management), market system, message center, etc. to better serve users.

5.2 Key indicators

In order to provide users with smoother and stable services, cryptocurrency exchanges need to meet some performance indicators, mainly the delay time and throughput value of order placement and withdrawal.

Table 2 lists some recommended indicators, which the exchange is required to maintain most of the time (95%, i.e., 347 d per year).

Table 2—Key indicators to measure the performance of the exchange

Key Indicator	Standard Recommended Value
Order Submission and Cancellation Throughput Peak	> 5000 transactions per second
API Order Submission Delay P50	< 20 ms
API Order Cancellation Delay P50	< 10 ms
API Order Submission Delay P95	< 50 ms
API Order Cancellation Delay P95	< 20 ms
Token Order Submission Delay P95	< 80 ms
Token Order Cancellation Delay P95	< 50 ms

5.3 User terminal specifications

The user terminal of the cryptocurrency exchanges shall contain at least the following elements:

— Market Panel: used to show the real-time market information of listed cryptocurrencies

— Trading Panel: used for users to buy and sell cryptocurrencies

— Asset Panel: used to display the information of user's crypto assets

— Deposit and Withdrawal Panel: used for users to withdraw and deposit their own assets

— Authentication Panel: used for users to conduct KYC authentication

Annex A

(informative)

An example of a centralized cryptocurrency exchange infrastructure

At present, the mainstream cryptocurrency exchanges are all centralized matchmaking, while some cryptocurrency exchanges adopt the peer-to-peer or broker mode for trading. In Figure A.1, we take a centralized matchmaking cryptocurrency exchanges as an example to briefly introduce the technical framework of a cryptocurrency exchanges.

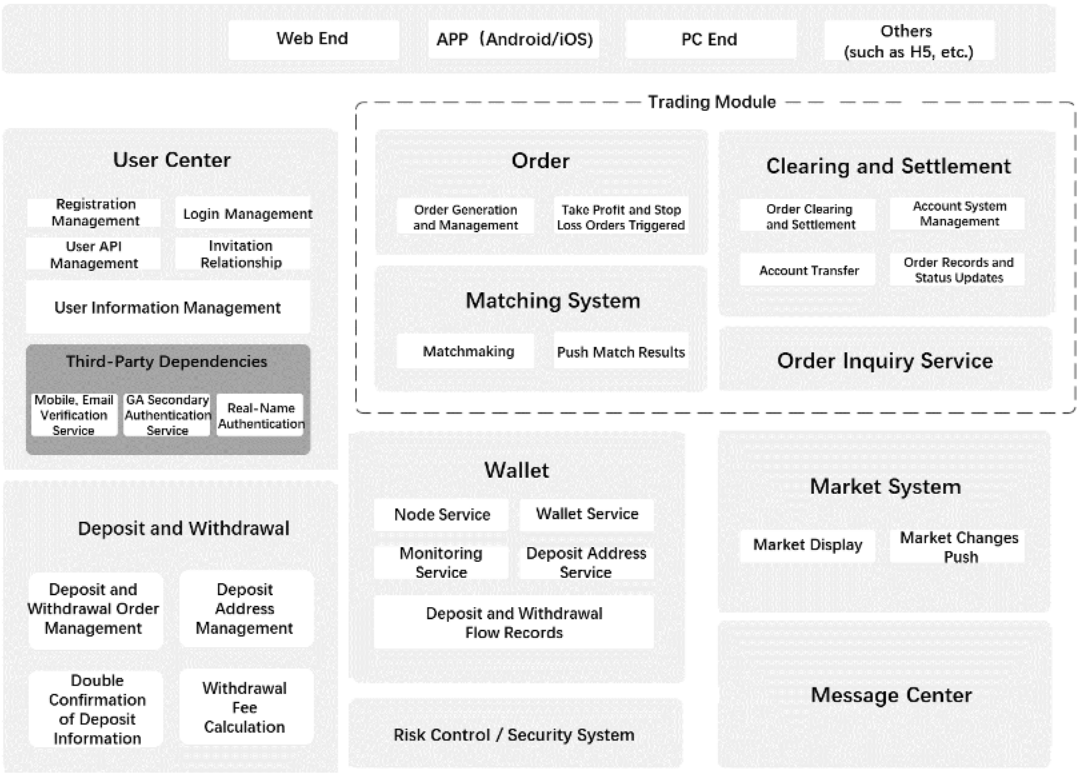

Figure A.1—Basic technical framework of cryptocurrency exchange

First, the front end of the cryptocurrency exchanges usually includes the Web end, APP end, PC end, etc. The backend system of the cryptocurrency exchanges needs to include multiple modules: trading module, user center module, user deposit and withdrawal module, wallet module, risk control security module, market module and message module.

Among them, the most important parts of the trading module are order, matchmaking, clearing and settlement, and inquiries. Based on the order module, users can perform functions of placing orders, withdrawing orders, and placing take-profit orders and stop-loss orders. The matchmaking module completes the matching of multiple user orders; The clearing and settlement module can complete the clearing and settlement of the user's account; The order inquiry module allows users to inquire about the order information.

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