# Xetion - A Structured Asset Blockchain Protocol

Whitepaper – Xetion AG – 29th of July 2018

**IMPORTANT NOTICE**

**PLEASE READ THIS SECTION AND THE FOLLOWING SECTIONS ENTITLED "DISCLAIMER OF LIABILITY", "NO REPRESENTATIONS AND WARRANTIES", "REPRESENTATIONS AND WARRANTIES BY YOU", "CAUTIONARY NOTE ON FORWARD-LOOKING STATEMENTS", "MARKET AND INDUSTRY INFORMATION AND NO CONSENT OF OTHER PERSONS", "NO ADVICE", "NO FURTHER INFORMATION OR UPDATE", "RESTRICTIONS ON DISTRIBUTION AND DISSEMINATION", "NO OFFER OF SECURITIES OR REGISTRATION" AND "RISKS AND UNCERTAINTIES" CAREFULLY.**

**IF YOU ARE IN ANY DOUBT AS TO THE ACTION YOU SHOULD TAKE, YOU SHOULD CONSULT YOUR LEGAL, FINANCIAL, TAX OR OTHER PROFESSIONAL ADVISOR(S).**

The XET tokens are not intended to constitute securities in any jurisdiction. This Whitepaper does not constitute a prospectus or offer document of any sort and is not intended to constitute an offer of securities or a solicitation for investment in securities in any jurisdiction.

This Whitepaper does not constitute or form part of any opinion on any advice to sell, or any solicitation of any offer by the distributor/vendor of the XET tokens (the "**Distributor**") to purchase any XET tokens nor shall it or any part of it nor the fact of its presentation form the basis of, or be relied upon in connection with, any contract or investment decision.

The Distributor will be an affiliate of Xetion AG ("**Xetion**"), and will deploy all proceeds of sale of the XET tokens to fund Xetion's cryptocurrency project, businesses and operations.

No person is bound to enter into any contract or binding legal commitment in relation to the sale and purchase of the XET tokens and no cryptocurrency or other form of payment is to be accepted on the basis of this Whitepaper.

Any agreement as between the Distributor and you as a purchaser, and in relation to any sale and purchase, of XET tokens (as referred to in this Whitepaper) is to be governed by only a separate document setting out the terms and conditions (the "**Terms and Conditions**") of such agreement. In the event of any inconsistencies between the Terms and Conditions and this Whitepaper, the former shall prevail.

You are not eligible and you are not to purchase any XET tokens in the Xetion Token Generation Event (as referred to in this Whitepaper) if you are a citizen, resident (tax or otherwise) or green card holder of the United States of America.

No regulatory authority has examined or approved of any of the information set out in this Whitepaper. No such action has been or will be taken under the laws, regulatory requirements or rules of any jurisdiction. The publication, distribution or dissemination of this Whitepaper does not imply that the applicable laws, regulatory requirements or rules have been complied with.

There are risks and uncertainties associated with Xetion and/or the Distributor and their respective businesses and operations, the XET tokens, the Xetion Token Generation Event and the Xetion Wallet, Accounts, Pools and any technical and non-technical facility of Xetion and XET tokens respectively (each as referred to in this Whitepaper).

This Whitepaper, any part thereof and any copy thereof must not be taken or transmitted to any country where distribution or dissemination of this Whitepaper is prohibited or restricted.

No part of this Whitepaper is to be reproduced, distributed or disseminated without including this section and the following sections entitled "Disclaimer of Liability", "No Representations and Warranties", "Representations and Warranties By You", "Cautionary Note On Forward-Looking Statements", "Market and Industry Information and No Consent of Other Persons", "Terms Used", "No Advice", "No Further Information or Update", "Restrictions On Distribution and Dissemination", "No Offer of Securities Or Registration" and "Risks and Uncertainties".

## DISCLAIMER OF LIABILITY

To the maximum extent permitted by the applicable laws, regulations and rules, Xetion and/or the Distributor shall not be liable for any indirect, special, incidental, consequential or other losses of any kind, in tort, contract or otherwise (including but not limited to loss of revenue, income or profits, and loss of use or data), arising out of or in connection with any acceptance of or reliance on this Whitepaper or any part thereof by you.

## NO REPRESENTATIONS AND WARRANTIES

Xetion and/or the Distributor does not make or purport to make, and hereby disclaims, any representation, warranty or undertaking in any form whatsoever to any entity or person, including any representation, warranty or undertaking in relation to the truth, accuracy and completeness of any of the information set out in this Whitepaper.

## REPRESENTATIONS AND WARRANTIES BY YOU

By accessing and/or accepting possession of any information in this Whitepaper or such part thereof (as the case may be), you represent and warrant to Xetion and/or the Distributor as follows:

(a) you agree and acknowledge that the XET tokens do not constitute securities in any form in any jurisdiction;

(b) you agree and acknowledge that this Whitepaper does not constitute a prospectus or offer document of any sort and is not intended to constitute an offer of securities in any jurisdiction or a solicitation for investment in securities and you are not bound to enter into any contract or binding legal commitment and no cryptocurrency or other form of payment is to be accepted on the basis of this Whitepaper;

(c) you agree and acknowledge that no regulatory authority has examined or approved of the information set out in this Whitepaper, no action has been or will be taken under the laws, regulatory requirements or rules of any jurisdiction and the publication, distribution or dissemination of this Whitepaper to you does not imply that the applicable laws, regulatory requirements or rules have been complied with;

(d) you agree and acknowledge that this Whitepaper, the undertaking and/or the completion of the Xetion Token Generation Event, or future trading of the XET tokens on any cryptocurrency exchange, shall not be construed, interpreted or deemed by you as an indication of the merits of the Xetion and/or the

Distributor, the XET tokens, the Xetion Token Generation Event and the Xetion Wallet, Accounts, Pools and any technical and non-technical facility of Xetion (each as referred to in this Whitepaper);

(e) the distribution or dissemination of this Whitepaper, any part thereof or any copy thereof, or acceptance of the same by you, is not prohibited or restricted by the applicable laws, regulations or rules in your jurisdiction, and where any restrictions in relation to possession are applicable, you have observed and complied with all such restrictions at your own expense and without liability to Xetion and/or the Distributor;

(f) you agree and acknowledge that in the case where you wish to purchase any XET tokens, the XET tokens are not to be construed, interpreted, classified or treated as:

- (i) any kind of currency other than cryptocurrency;
- (ii) debentures, stocks or shares issued by any person or entity (whether Xetion and/or the Distributor)
  - (i) rights, options or derivatives in respect of such debentures, stocks or shares;
  - (ii) rights under a contract for differences or under any other contract the purpose or pretended purpose of which is to secure a profit or avoid a loss;
- (iii) units in a collective investment scheme;
- (iv) units in a business trust;
- (v) derivatives of units in a business trust; or
- (vi) any other security or class of securities.

(g) you are fully aware of and understand that you are not eligible to purchase any XET tokens if you are a citizen, resident (tax or otherwise) or green card holder of the United States of America;

(h) you have a basic degree of understanding of the operation, functionality, usage, storage, transmission mechanisms and other material characteristics of cryptocurrencies, blockchain-based software systems, cryptocurrency wallets or other related token storage mechanisms, blockchain technology and smart contract technology;

(i) you are fully aware and understand that in the case where you wish to purchase any XET tokens, there are risks associated with Xetion and the Distributor and their respective business and operations, the XET tokens, the Xetion Token Generation Event and the Xetion Wallet, Accounts, Pools and any technical and non-technical facility of Xetion (each as referred to in the Whitepaper);

(j) you agree and acknowledge that neither Xetion nor the Distributor is liable for any indirect, special, incidental, consequential or other losses of any kind, in tort, contract or otherwise (including but not limited to loss of revenue, income or profits, and loss of use or data), arising out of or in connection with any acceptance of or reliance on this Whitepaper or any part thereof by you; and

(k) all of the above representations and warranties are true, complete, accurate and non-misleading from the time of your access to and/or acceptance of possession this Whitepaper or such part thereof (as the case may be).

## CAUTIONARY NOTE ON FORWARD-LOOKING STATEMENTS

All statements contained in this Whitepaper, statements made in press releases or in any place accessible by the public and oral statements that may be made by Xetion and/or the Distributor or their respective directors, executive officers or employees acting on behalf of Xetion or the Distributor (as the case may be), that are not statements of historical fact, constitute "forward- looking statements". Some of these statements can be identified by forward-looking terms such as "aim", "target", "anticipate", "believe", "could", "estimate", "expect", "if", "intend", "may", "plan", "possible", "probable", "project", "should", "would", "will" or other similar terms. However, these terms are not the exclusive means of identifying forward-looking statements. All statements regarding Xetion's and/or the Distributor's financial position, business strategies, plans and prospects and the future prospects of the industry which Xetion and/or the Distributor is in are forward-looking statements. These forward-looking statements, including but not limited to statements as to Xetion's and/or the Distributor's revenue and profitability, prospects, future plans, other expected industry trends and other matters discussed in this Whitepaper regarding Xetion and/or the Distributor are matters that are not historic facts, but only predictions.

These forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause the actual future results, performance or achievements of

Xetion and/or the Distributor to be materially different from any future results, performance or achievements expected, expressed or implied by such forward-looking statements. These factors include, amongst others:

(a) changes in political, social, economic and stock or cryptocurrency market conditions, and the regulatory environment in the countries in which Xetion and/or the Distributor conducts its respective businesses and operations;

(b) the risk that Xetion and/or the Distributor may be unable or execute or implement their respective business strategies and future plans;

(c) changes in interest rates and exchange rates of fiat currencies and cryptocurrencies;

(d) changes in the anticipated growth strategies and expected internal growth of Xetion and/or the Distributor;

(e) changes in the availability and fees payable to Xetion and/or the Distributor in connection with their respective businesses and operations;

(f) changes in the availability and salaries of employees who are required by Xetion and/or the Distributor to operate their respective businesses and operations;

(g) changes in preferences of customers of Xetion and/or the Distributor;

(h) changes in competitive conditions under which Xetion and/or the Distributor operate, and the ability of Xetion and/or the Distributor to compete under such conditions;

(i) changes in the future capital needs of Xetion and/or the Distributor and the availability of financing and capital to fund such needs;

(j) war or acts of international or domestic terrorism;

(k) occurrences of catastrophic events, natural disasters and acts of higher force that affect the businesses and/or operations of Xetion and/or the Distributor;

(l) other factors beyond the control of Xetion and/or the Distributor; and

(m) any risk and uncertainties associated with Xetion and/or the Distributor and their businesses and operations, the XET tokens, the Xetion Token Generation Event and the Xetion Wallet, Accounts, Pools and any technical and non-technical facility of Xetion (each as referred to in the Whitepaper).

All forward-looking statements made by or attributable to Xetion and/or the Distributor or persons acting on behalf of Xetion and/or the Distributor are expressly qualified in their entirety by such factors. Given that risks and uncertainties that may cause the actual future results, performance or achievements of Xetion and/or the Distributor to be materially different from that expected, expressed or implied by the forward-looking statements in this Whitepaper, undue reliance must not be placed on these statements. These forward-looking statements are applicable only as of the date of this Whitepaper.

Neither Xetion, the Distributor nor any other person represents, warrants and/or undertakes that the actual future results, performance or achievements of Xetion and/or the Distributor will be as discussed in those forward-looking statements. The actual results, performance or achievements of Xetion and/or the Distributor may differ materially from those anticipated in these forward- looking statements.

Nothing contained in this Whitepaper is or may be relied upon as a promise, representation or undertaking as to the future performance or policies of Xetion and/or the Distributor.

Further, Xetion and/or the Distributor disclaim any responsibility to update any of those forward- looking statements or publicly announce any revisions to those forward-looking statements to reflect future developments, events or circumstances, even if new information becomes available or other events occur in the future.

## MARKET AND INDUSTRY INFORMATION AND NO CONSENT OF OTHER PERSONS

This Whitepaper includes market and industry information and forecasts that have been obtained from internal surveys, reports and studies, where appropriate, as well as market research, publicly available information and industry publications. Such surveys, reports, studies, market research, publicly available information and publications generally state that the information that they contain has been obtained from sources believed to be reliable, but there can be no assurance as to the accuracy or completeness of such included information.

Save for Xetion, the Distributor and their respective directors, executive officers and employees, no person has provided his or her consent to the inclusion of his or her name and/or other information attributed or perceived to be attributed to such person in connection therewith in this Whitepaper and no representation, warranty or undertaking is or purported to be provided as to the accuracy or completeness of such information by such person and such persons shall not be obliged to provide any updates on the same.

While Xetion and/or the Distributor have taken reasonable actions to ensure that the information is extracted accurately and in its proper context, Xetion and/or the Distributor have not conducted any independent review of the information extracted from third party sources, verified the accuracy or completeness of such information or ascertained the underlying economic assumptions relied upon therein. Consequently, neither Xetion, the Distributor, nor their respective directors, executive officers and employees acting on their behalf makes any representation or warranty as to the accuracy or completeness of such information and shall not be obliged to provide any updates on the same.

**TERMS USED**

To facilitate a better understanding of the XET tokens being offered for purchase by the Distributor, and the businesses and operations of Xetion and/or the Distributor, certain technical terms and abbreviations, as well as, in certain instances, their descriptions, have been used in this Whitepaper. These descriptions and assigned meanings should not be treated as being definitive of their meanings and may not correspond to standard industry meanings or usage.

Words importing the singular shall, where applicable, include the plural and *vice versa* and words importing the masculine gender shall, where applicable, include the feminine and neuter genders and *vice versa*. References to persons shall include corporations.

**NO ADVICE**

No information in this Whitepaper should be considered to be business, legal, financial or tax advice regarding Xetion, the Distributor, the XET tokens, the Xetion Token Generation Event and the Xetion Wallet, Accounts, Pools and any technical and non-technical facility of Xetion (each as referred to in the Whitepaper). You should consult your own legal, financial, tax or other professional adviser regarding Xetion and/or the Distributor and their respective businesses and operations, the XET tokens, the Xetion Token Generation Event and the Xetion Wallet, Accounts, Pools and any technical and non-technical facility of Xetion (each as referred to in the Whitepaper). You should be aware that you may be required to bear the financial risk of any purchase of XET tokens for an indefinite period of time.

**NO FURTHER INFORMATION OR UPDATE**

No person has been or is authorised to give any information or representation not contained in this Whitepaper in connection with Xetion and/or the Distributor and their respective businesses and operations, the XET tokens, the Xetion Token Generation Event and the Xetion Wallet, Accounts, Pools and any technical and non-technical facility of Xetion (each as referred to in the Whitepaper) and, if given, such information or representation must not be relied upon as having been authorised by or on behalf of Xetion and/or the Distributor. The Xetion Token Generation Event (as referred to in the Whitepaper) shall not, under any circumstances, constitute a continuing representation or create any suggestion or implication that there has been no change, or development reasonably likely to involve a material change in the affairs, conditions and prospects of Xetion and/or the Distributor or in any statement of fact or information contained in this Whitepaper since the date hereof.

## RESTRICTIONS ON DISTRIBUTION AND DISSEMINATION

The distribution or dissemination of this Whitepaper or any part thereof may be prohibited or restricted by the laws, regulatory requirements and rules of any jurisdiction. In the case where any restriction applies, you are to inform yourself about, and to observe, any restrictions which are applicable to your possession of this Whitepaper or such part thereof (as the case may be) at your own expense and without liability to Xetion and/or the Distributor.

Persons to whom a copy of this Whitepaper has been distributed or disseminated, provided access to or who otherwise have the Whitepaper in their possession shall not circulate it to any other persons, reproduce or otherwise distribute this Whitepaper or any information contained herein for any purpose whatsoever nor permit or cause the same to occur.

## NO OFFER OF SECURITIES OR REGISTRATION

This Whitepaper does not constitute a prospectus or offer document of any sort and is not intended to constitute an offer of securities or a solicitation for investment in securities in any jurisdiction. No person is bound to enter into any contract or binding legal commitment and no cryptocurrency or other form of payment is to be accepted on the basis of this Whitepaper. Any agreement in relation to any sale and purchase of XET tokens (as referred to in this Whitepaper) is to be governed by only the Terms and Conditions of such agreement and no other document. In the event of any inconsistencies between the Terms and Conditions and this Whitepaper, the former shall prevail.

You are not eligible to purchase any XET tokens in the Xetion Token Generation Event (as referred to in this Whitepaper) if you are a citizen, resident (tax or otherwise) or green card holder of the United States of America.

No regulatory authority has examined or approved of any of the information set out in this Whitepaper. No such action has been or will be taken under the laws, regulatory requirements or rules of any jurisdiction. The publication, distribution or dissemination of this Whitepaper does not imply that the applicable laws, regulatory requirements or rules have been complied with.

## RISKS AND UNCERTAINTIES

Prospective purchasers of XET tokens (as referred to in this Whitepaper) should carefully consider and evaluate all risks and uncertainties associated with Xetion, the Distributor and their respective businesses and operations, the XET tokens, the Xetion Token Generation Event and the Xetion Wallet, Accounts, Pools and any technical and non-technical facility of Xetion (each as referred to in the Whitepaper), all information set out in this Whitepaper and the Terms and Conditions prior to any purchase of XET tokens. If any of such risks and uncertainties develops into actual events, the business, financial condition, results of operations and prospects of Xetion and/or the Distributor could be materially and adversely affected. In such cases, you may lose all or part of the value of the XET tokens.

# Xetion - A Structured Asset Blockchain Protocol

Florian Aram Menevis
fa@xetion.com

June 2017 - v.0.6

## Contents

## Abstract

With the ever increasing emission of new crypto coins and tokens and the formation of markets running on blockchain technologies, the need to diversify capital in these markets emerges. Xetion introduces a scalable blockchain architecture for the emission, mandated on-chain management and decentralised exchange of combinatorial bundles of crypto tokens, that are in essence structured crypto token assets (SCTAs).

Xetion and its on-chain mandate mechanism ensure trustless mandating wherein the owner of tokens of combinatorial assets always holds the private keys of tokens contained in a structured crypto token asset (SCTA).

Structured crypto token assets on Xetion allow for decentralised diffusion of capital into crypto markets, and might further capitalise markets by offering diversification for wealth seeking long term passive participation in crypto currencies and tokenized blockchain applications. In the greater scheme combinatorial token allocations lead to the formation of smarter markets that operate more efficiently by processing combinatorial batches of tokens instead of binary pairs, thus increasing cross network liquidity and proximity to equilibrium liquidity across chains and markets.

## 1 Preface

The intention of this paper is to give an overview of the Xetion blockchain architecture and possible applications. More detailed papers will be published in the future, specifically for governance models and cross chain interactions on Xetion.

## 2 Introduction

Projections for global assets under management (AuM) are projected to reach approximately 112 trillion USD according to research from Price Waterhouse Coopers[1]. The key strategy for managing wealth is, in general, to diversify capital into different asset classes in order to mitigate risks. In this context it is clear that investing in crypto tokens as part of a greater portfolio will continue to be in increasing demand by private and institutional entities looking to invest capital passively in growing blockchain ecosystems and markets.

Some banks and stock exchanges started to offer Bitcoin[2] trading, although such offers mainly relate to derivatives of Bitcoin or other legally bound promises of banks or funds to hold Bitcoin and other tokens, whereas clients technically dont own the (underlying) asset in most cases. Existing capital markets and stock exchanges often face technical difficulties in adopting new crypto tokens, resulting in offerings to clients, which are poorly diversified and lack security that actual crypto tokens would have in technical terms (a problem that applies to most crypto exchanges as well, as they lack a decentralised architecture).

Xetion allows diversifying capital in crypto tokens by enabling crypto tokens to be bundled into structured crypto token asset (SCTA), while enabling owners to technically own all tokens of an SCTA by holding the private keys to the owned tokens. In essence Xetion enables decentralised diversification of capital in crypto markets.

## 3 Xetion Blockchain

Diversifying capital in crypto assets is a notoriously strenuous process as building a portfolio requires either manually buying crypto currencies on centralised exchanges or entrusting a third party (a fund) to build a portfolio, though the latter is not governed by means of a blockchain but conventional legal regulation for managing assets.

The fundamental problem is that analysts with deep knowledge of blockchain technologies and ideas for building diversified crypto funds have no (decentralised) infrastructure available to effectively offer

[1] *Asset & Wealth Management Insights Asset Management 2020: Taking stock.* 2017. URL: `https://www.pwc.com/gx/en/asset-management/asset-management-insights/assets/am-insights-june-2017.pdf`.

[2] *S. Nakamoto, Bitcoin: A peer-to-peer electronic cash system.* 2008. URL: `https://bitcoin.org/bitcoin.pdf`.

their investment strategies for participation of third parties.

Xetion aims at enabling the operation of a truly global and decentralised infrastructure to emit and trade structured assets consisting of combinatorial bundles of tokens and coins. In particular, Xetion solves ownership and trust issues between mandated and owning parties of a structured asset and allows for an automated and trustless settlement of fees, token allocation and liquidation. At the core Xetion makes structured crypto assets independent both technically and legally (implied legal independence through technical standardization) of managing and mandated parties, increasing security and versatility for investors looking to (passively) diversify capital in crypto markets. This is beneficial for both owning and managing parties as Xetion allows for technical and procedural consensus, allowing managing parties to focus on leveraging their domain expertise and strategy (rather than discussing technical, procedural and legal questions under ambiguous circumstances).

## 3.1 Tokens, Blocks and Entities

While being stateless from an SCTA-emitters perspective, the Xetion blockchain keeps track of states linked to sidechains for initiating token transactions in accounts. Following is the description of SCTA classes, states and sidechains. Potential issues and solutions are discussed further in section 6.1.

### 3.1.1 Xetion Token

Transactional use of the Xetion blockchain is subject to charges of Xetion (XET) tokens. Emitting parties may levy charges for buying, liquidating and administering assets, while parties providing network resources might charge for transactions and asset modifications.

The distribution of the XET tokens in the initial block will be determined by a smart contract hosted on Ethereum. Additional XET tokens can be mined, subsequently. All network fees are subject to charges in XET tokens, while all SCTA induced transactions settle in XET tokens.

### 3.1.2 Account

Accounts have an address, a balance of XET tokens and a nonce which increases with every transaction or modification and the size of its last update. Having an active account is subject to a small fee for the period of time it is operated. Charges for creating and operating accounts prevents misuse and deters state-bloat. Deleting account alleviates occupation of space which is not in use.

### 3.1.3 SCTAs

Every account on Xetion can emit SCTAs. An SCTA is an entity on the Xetion blockchain that has a unique identifier and hash, and can either be a non-bound SCTA or an SCTA bound to a liquidity pool (making bound SCTAs a finite resource as liquidity is the limiting factor for emission and availability).

### 3.1.4 Name System

Xetion features a name system that allows to resolve mapping from unique but human-readable strings to defined byte arrays. Names on Xetion can point to account address, SCTAs or hashes.

### 3.1.5 Block contents

A block on the Xetion blockchain has to following contained in it:

- Hash of previous block.
- Merkle tree of transactions.
- Merkle tree of accounts.
- Merkle tree of names.
- Merkle tree of open pools.
- Merkle tree of emitted SCTAs
- Merkle tree of SCTA token ratio matrix.
- Merkle tree of Merkle proofs.
- The current entropy in the random number generator.

In order to maintain the sequence within the blockchain the hash of a preceding block is required. The tree of transactions contains all transactions of a block. Apart from the consensus vote tree all trees are under full consensus. Changing a tree from one block to the next is required in order to have a transaction in the new blocks transaction tree. A Merkle proof of the update has to be included in the blocks proof tree as well.

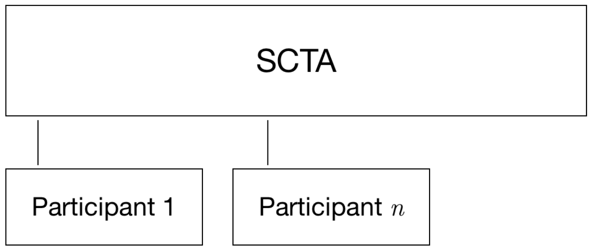


Figure 1: An SCTA has a one-to-many relationship with participating accounts.

## 3.2 SCTA Mechanics

Structured crypto token assets on Xetion are a more specific type of smart contract (or smart mandate) which is less versatile but optimised for mandated fund allocation within composite assets without compromising token ownership and security of tokens as such. An SCTA always has a specific state, though induced transactions can be bound to conditions and may require signatory consent from both emitter and holder for certain transactions, modifications or liquidation. While the state of an SCTA is global, induced transactions might disseminate asynchronously.

Technically an SCTA can be liquidated or micro-forked by a participating party. This ensures that the emitter of an SCTA has an incentive to retain participating parties by acting in their interest and ensure that the SCTA is useful. Likewise a partaking party has no interest to withdraw from an SCTA if it is successful and useful.

### 3.2.1 Basic Architecture

SCTAs, in essence, allocate and distribute funds. Each emitted SCTA is unique but can have multiple accounts participating asynchronously and with different aggregate funds allocated per account. The degree to which SCTA distribution and allocation is automated can vary and is subject to the participating parties agreeing to the terms specific to a particular SCTA. Absolute boundaries on such terms ensure that crypto-signatory consent of participating parties (or liquidation or forking) is required for critical actions such as liquidating funds held in an SCTA or changes of fees and terms. Terms of a specific SCTA are global and apply universally to all participating accounts.

### 3.2.2 Classes

There are three distinct classes of SCTAs.

**S-SCTA** - Static Structured Crypto Asset. A static SCTA contains a predefined, non-alterable set of tokens and coins and corresponding ratios.

**M-SCTA** - Managed Structured Crypto Asset. A managed SCTA contains a set of tokens and coins which is subject to mandated change of the emitter. The set of coins or corresponding ratios can be altered by the emitter.

**D-SCTA** - Dynamic Structured Crypto Asset. A dynamic SCTA is mandated by a virtual machine which can run computations to create and dynamically alter a set of coins and tokens and corresponding ratios.

An SCTA can be either public or private, can have an infinite or finite term and be unbound or bound to a liquidity pool. Types of tokens and coins (potentially) contained in an SCTA must be whitelisted at emission, or post hoc by signatory consent of participating accounts.

In addition to SCTAs, free derivatives can be emitted on Xetion. Derivatives are useful as they allow for a number of applications such as hedging or easing volatility that might complement certain SCTAs and enhance overall portfolio resilience.

#### 3.2.3 Token Ratio Matrices

Tokens in an SCTA are denoted as matrices with corresponding weights to which capital should be allocated to tokens.

$$\begin{pmatrix} \text{Token } c & \text{Weight } w \\ A & 0.6 \\ B & 0.3 \\ C & 0.1 \end{pmatrix} \longrightarrow \begin{pmatrix} A_c & A_w \\ B_c & B_w \\ C_c & C_w \end{pmatrix} \tag{1}$$

$$= \begin{pmatrix} A & 0.6 \\ B & 0.3 \\ C & 0.1 \end{pmatrix} \tag{2}$$

Using matrix notation has the advantage of being able to make complex statistical calculations and projections using matrix algebra and thereby simplify computations. Apart from tokens $c$ and weights $w$ we can use further variables to denote price $p$ and return $\mu$ and variance $\sigma$. We assume that $w_A + w_A + w_A = 1$.

We can calculate return of the SCTA $R_{\text{SCTA}} = A(w_t \mu_t) + N(w_t \mu_t)$ and the variance on the return $\sigma^2_{\text{SCTA},w} = \text{var}(R_{\text{SCTA},\,w})$.

Further we can use $n \times 1$ vectors for denoting matrixes for variables

$$X = \begin{pmatrix} y_A \\ y_n \end{pmatrix} \tag{3}$$

And, we can refer to vectors at different points in time $X_{t1} \cdots X_{tn}$.

Consider an SCTA and a matrix containing tokens and their weights at current state as $X$ with. We can arrange for changes in weights and subsequent redistribution (existing relative ratios of $w$ carried forward).

$$\chi_{n0} = w_\alpha \cdot x \; + \; (1 \; - \; \alpha) \cdot \partial \tag{4}$$

$$\chi_{n1} = w_\alpha \cdot \Sigma^{-1} \mu_w \; + \; (1 \; - \; \alpha) \cdot \Sigma^{-1} \mu_w \tag{5}$$

$$= \Sigma^{-1} \mu_w^{-1} \tag{6}$$

Accordingly, we can compute modification of SCTA.

$$\Rightarrow c(d) = 0.2 \tag{7}$$

$$\Rightarrow p.vec = w \cdot x.vec + (1 - w) \cdot z.vec \tag{8}$$

$$\Rightarrow p.vec \tag{9}$$

$$\begin{matrix} A & B & C & D \end{matrix}$$

$$\begin{pmatrix} 0.48 & 0.24 & 0.08 & 0.2 \end{pmatrix} \tag{10}$$

The above illustrates the most standard of cases, but using nearly any specific statistical or other combinatorial or algebraic method to change absolute and relative ratios of token weights is highly feasible and can be done using Xetions virtual machines.

#### 3.2.4 Allocation Transactions

An SCTA can induce transaction instructions in its transaction sidechain by changing its token ratio matrix. The transaction sidechain of an SCTA then disseminates sets of individual transaction instructions to accounts participating in the SCTA and calculates individual fees which are then levied from the wallet and credited to SCTA emitters, pools (if any) and network and node operators. Instructions disseminated on the sidechain of an SCTA may be subject to individual signatory consent which can be signed with a respective accounts hash.

Accounts participating in an SCTA can not induce transactions other than to depreciate or appreciate aggregate allocation to an SCTA, or liquidation or micro-forking.

The transaction sidechain on Xetion processes transactions as combinatorial batches which essentially mirror (updated) token ratio matrices. The market making for auctions is automated (AMM)[3] by using a combinatorial order book that self-optimises allocation of network liquidity and thus ensures effective throughput of cross-chain transactions.

We achieve efficient matching of combinatorial batches for transactions by bundling batches in heaps and then balance network proximity with the size of heaps and probability of matching respectively. Sim-

[3] *Casey Detrio, "Smart Markets for Stablecoins" 2016.* 2016. URL: `http://cdetr.io/smart-markets/`.

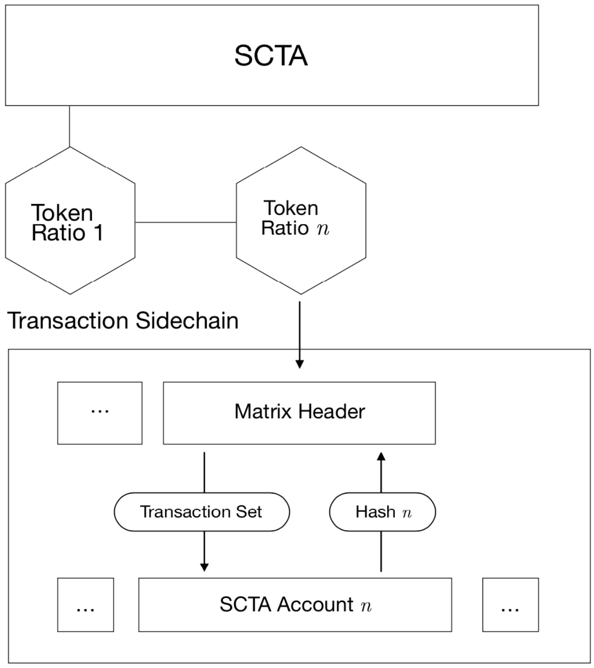


Figure 2: Inducing allocation-related transactions of an SCTA in individual accounts.

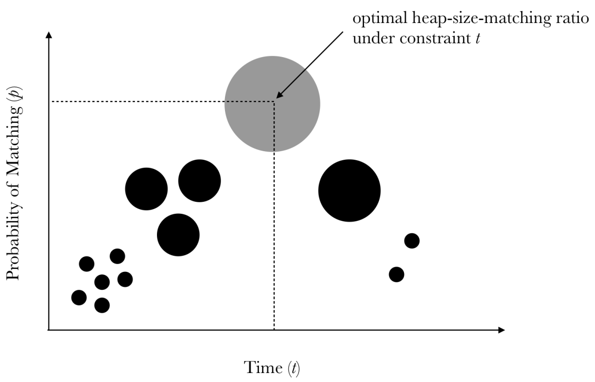


Figure 3: Model for matching transactions of token ratio matrices.

```
macr acc 987fgf8...s09d(pos 346bapl711g)
: hashlock
        BTC 1.25787  ETH 3.21894
        BCC 1.247    CAR 8.1879
        IOT 897.98
```

ilar approaches of clustering have been shown to increase scalability[4].

Similarly to hash graphs and its theory of propagating by gossiping through networks[5], we build heaps based on network proximity. Heaps will grow as long as sufficient probability for matching token ratio matrices within the heap is achieved, constrained by a maximum size relative to global network load.

Matching metrices are then hashlocked[6] to induce transactions. Tokens of excess are queued for pair swaps.

#### 3.2.5 Participation and Micro Governance

The emitter of an SCTA technically controls the entity (mandate) but never tokens held in participating account (and wallets). As each SCTA has a dedicated sidechain for inducing transactions in accounts, it is in a way a microcosm, that, albeit with constraints, is a decentralised network of its own. Therefore each SCTA can specify terms for participation and is subject to its own micro governance.

Participation in an SCTA can be restricted by the emitter to be either public or private, to have minimum or maximum aggregate capital invested per account participating, to be subject of an initial hard cap or to be subject of availability of liquidity of a connected pool.

An SCTA can be specified to run for an infinite pe-

[4] *Alessandro Chiesa, Eran Tromer, Madars Virza "Cluster Computing in Zero Knowledge"*. 2016. URL: https://eprint.iacr.org/2015/377.pdf.

[5] *Leemon Baird, "The Swirlds Hashgraph Consensus Algorithm: Fair, Fast, Byzantine Fault Tolerance"*. 2014. URL: http://www.swirlds.com/downloads/SWIRLDS-TR-2016-01.pdf.

[6] *Joseph Poon, Thaddeus Dryja, "The Bitcoin Lightning Network: Scalable Off-Chain-Instant Payments"¡Paste¿*. 2016. URL: https://lightning.network/lightning-network-paper.pdf.

riod of time or be terminated on a predefined point of time. A DSCTA might also self-terminate if specified conditions are met. Termination leads to automated liquidation of tokens in participating accounts and conversion to XET credit.

The inherent separation of SCTA entities as mandates and actual allocation and transaction is intended to lead to a balance of controls that fosters a meritocratic environment for emitting and maintaining useful and successful SCTAs. Changes in the terms of an SCTA either lead to consensus (of participants deciding to continue on new terms), micro forking or liquidation by participating accounts individually. In this context the emitter of an SCTA has a strong incentive to keep (a majority of) allocated capital invested or attract additional capital for investment, all in order to amplify successful investment strategies that generate commission on returns for the emitter.

#### 3.2.6 Micro Forks and Liquidations

Any SCTA on Xetion can be micro forked, which leads to the emission of a new SCTA. Empty micro forks can fork any state in time from the point of emission of the SCTA without replicating current token allocation and ratios, while forking with allocated tokens is possible for the current state and will induce liquidation of the existing SCTA. Regular liquidation is possible at all times, resulting in automated liquidation of tokens in the participating account and conversion to XET token credit. Forced liquidation can occur if a participating account does not provide signatory consent to continued allocation after changes in terms of an SCTA, within the timeframe specified in the terms of the SCTA.

#### 3.2.7 Cross Chain Operations

Similarly to recently emerged projects like Cosmos[7] and Plasma[8], the Xetion blockchain can exchange coins and tokens across different blockchains (e.g. ETH-BTC) without making use of full-custody emitted assets for native chains and tokens. The token ratio matrix of an SCTA is replicated in accounts holding it and each entry of the matrix is signed with the accounts hash and is part of the proof-of-work consensus.

We are aware that tokens of other blockchains could still be transferred implicitly, but then again, this is intentional by design as participation in an SCTA should never compromise actual asset ownership (holding private keys of tokens). On the other hand the de-facto unbundling of position participating in an SCTA will lead to automated liquidation for the respective account (or forking of a deviated SCTA).

#### 3.2.8 Liquidity Pools

As liquidity can be limited in (some) crypto currencies, the emitter of an SCTA can provide a liquidity pool. Tokens provided in the liquidity pool are held in an on-chain pledge state until allocated in accounts participating in the SCTA. Failure to provide the liquidity on part of the emitter gives participating accounts the right to fee-less liquidation. Such liquidations due to lack of providing pledged liquidity can be expected to occur rarely, as the SCTA emitter has a strong incentive to provide liquidity, which, in essence, means exchanging tokens for additional fees (in favour of the emitter).

#### 3.2.9 Fee Calculation and Settlement

All fees are calculated and settled in XET. For fees commissioned from returns the aggregate value of an SCTA is determined by pairing tokens with XET and calculating net performance in XET.

### 3.3 Consensus Mechanism

Xetion uses a consensus method that is a hybrid between Proof-of-Work and Proof-of-Stake. The sequence of blocks on the chain will be determined by Proof-of-Work. For the Proof-of-Work algorithm we use slightly modified derivative of the Cuckoo Cycle

[7] *Jae Kwon, Ethan Buchman, "Cosmos A Network Distributed Ledger"*. 2017. URL: `https://cosmos.network/about/whitepaper`.

[8] *Joseph Poon, Vitalik Buterin, "Plasma: Scalable Autonomous Smart Contracts"*. 2017. URL: `https://lightning.network/lightning-network-paper.pdf`.

algorithm originally conceived by John Tromp[9]. The advantage of the our derivative of the Cuckoo Cycle algorithm is that it is bound by memory and therefore caters to memory latency availability as the limiting factor. This can foster decentralisation as even less performant devices (e.g. mobile phones) can mine tokens.

> ,,When even phones charging overnight can mine without orders of magnitude loss in efficiency, not with a mindset of profitability but of playing the lottery, the mining hardware landscape will see vast expansion, benefiting adoption as well as decentralisation."

Another key aspect is that beside agreeing on block sequence, the Xetion consensus mechanism solves for token ratio matrices to have on-chain states. In theory the consensus mechanism could be self-amending, though this is might still cause problematic effects when such amendments have to disseminate across the network. On the other hand, using a simple Proof-of-Work mechanism could lead to miners in tendency being chosen selectively by SCTA emitters to run their nodes and provide XET liquidity for their operations, effectively leading to a corruption of the balance between participants and emitters. For this reason Xetion uses a new hybrid approach combining Proof-of-Work and Proof-of-Stake in order to make use of the strength of each of these consensus approaches where they fit best. Apart from general consensus as such, XET tokens will be issued by a pure Proof-of-Work approach, preserving a truly decentralised nature of the network at the core and in the essence of its own tokens.

#### 3.3.1 SCTA Consensus

On-chain settlement of states of an SCTA is critical in order to maintain operability and induced transactions. The general and legitimate incentive to generate revenue of XET is to create well performing and useful SCTAs which is rewarded in longevity and success commission (which translates to linear and potentially exponential rewards). Mining is still required to prevent quasi monopolisation and to ensure a minimal hurdle of difficulty in order to prevent inflationary tendencies of using XET tokens (and therefore network resources) as such, but should ideally not be intended as an end in itself and major stream for revenues.

Therefore we optimise our derivative proof-of-work algorithm not for the absolute profit but to increase the cumulative number of blocks which are settled on the chain and propagated on the network. We define the relative profit $p_{rel}$ in equation 11 where $p_{ai}$ and $p_{hi}$ are the profits in step I for the antagonistic and fair network, respectively:

$$P_{rel} = \mathbb{E}\left[\lim_{n\to\infty} \frac{\sum_{i=1}^{n} pa_i}{\sum_{i=1}^{n}(pa_i + pf_i)}\right] \tag{11}$$

As the antagonistic entity is focused on optimising itself for his relative profit $P_{rel}$ (equation 11) in mining profits, the problem of a an individual entity on the network making such decisions cannot be described as an MDP (Multi Dimensional Pattern) because the process of awarding as such is non-linear. In order to be described in terms of an MDP we presume that the value of the objective function (the optimal relative profit) is *pho* and define for $p \in [0, 1]$ the transformation function $w_\rho : \mathbb{N}^2 \to \mathbb{R}$ with the antagonistic profit $p_a$ and the profit for the fair network $p_h$ in equation 12.

$$w_\rho\Big(p_a, p_f\Big) = \Big(1-\rho\Big)\cdot p_a - \rho \cdot p_f \tag{12}$$

Resulting in an infinite state MDP $M_\rho = \langle S, A, P, w_p(R)\rangle$ for every $\rho$ that has the same operation state space as the original entity-decision problem and the equivalent transition matrix but the profit matrix is transformed by $W_{pho}$. The expected value of such an MDP under policy $\pi$ is then defined by $v_\rho^\pi$ in equation 13, where $p_i(\pi)$ is the profit tuple in step I under policy $\pi$.

$$v_\rho^* = \mathbb{E}\left[\lim_{n\to\infty} \frac{1}{n}\sum_{i=1}^{n} w_\rho p_i \pi\right] \tag{13}$$

[9] *John Tromp, "Cuckoo Cycle: a memory bound graph-theoretic proof-of-work"*. 2014. URL: `https://eprint.iacr.org/2014/059.pdf`.

The expected value subjected to the optimal policy:

$$v_\rho^* = \max_{\pi \in A} \left\{ v_\rho^\pi \right\} \tag{14}$$

By using binary search on our MDPs for $\rho \in [0, 1]$ we can find $\rho$ with the expected value in the initially propagated MDP being zero, which subsequently maximise profit in the original individual-entity decision process. As $v_\rho^*$ is monotonically decreasing, we use the following function to effectively determine model propagation.

## 3.4 Governance

Tezos has demonstrated the paradigm of on-chain governance[10], which effectively leads to a self-amending ledger.

While governance of blockchains has thus far often failed to foster sustained consensus for technical advancements of a chain, it seems that on-chain mechanism to reach orchestrated consensus for amendments to a chain lead to overall better consensus between stakeholders.

Xetion has an inherent approach of separating ownership of tokens and administrative mandates, which as such already leads to a certain balance in the system. While emitters hold the stake of knowledge (to create successful investment and hedging strategies), participants hold the stake of value. Neither group can increase profits with the other, which creates a basic balance of power in the network. In theory emitters and participants could consist a single party, but this is unlikely to manifest in any significant fraction in reality, as human knowledge to emit and operate an SCTA successfully for longer periods of time is a scarce resource, whereas holders of tokens likely outnumber emitters significantly. As established beforehand, SCTAs can be micro forked, but this again is likely to be a means of last resort for most SCTA participants. Essentially micro-forking or inducing liquidation of an SCTA is resulting in quasi-threat of mutually assured destruction, wherein the upside of finding consensus is by magnitude more rewarding in terms of profits for all participating parties. The risk of the emergence of quasi-mining-monopolies is limited by having memory-latency limited mining and a consensus algorithm optimised for favouring network integrity over individual profit maximisation.

[10] *L.M Goodman, "Tezos – a self-amending crypto-ledger White paper"*. 2014. URL: `https://www.tezos.com/static/papers/white_paper.pdf`.

However, over time Xetion like any other blockchain must be potentially able to conduct updates to its algorithms and protocols. Such updates are governed by a weighted voting approach that is weighted according to merits and loyalty of parties in the network, establishing a balanced approach between broad democratic decision-making and meritocratic technocracy.

Voting on regular iteration proposals is a two-phase process, where in a first phase any proposal has to meet a certain signatory threshold in order to be put in line for network wide voting.

In addition a task-force consisting of 24 members for matters of network stabilisation is elected periodically by the network. In an event of urgency the task force can submit urgent update proposals which are implemented if not rejected by majority veto of the network.

## 3.5 Scalability

As transactions of SCTAs are processed on their own respective chains, a fair degree of parallelism is achieved at the outset and makes Xetions architecture highly scalable. In addition Xetion uses the following approaches to optimise scaleability further.

### 3.5.1 Sharding

Xetions blockchain is operational for a user when the part of the chain he is momentarily interested in has been synchronised as long as one duplicate of the state has been synchronised previously. This way new users can be sure that substates are accurately represented. Such substates can also be carried forward across several nodes so that loads for nodes in general are rather small. The integrity of a substate can be proved by validating hashes of corresponding Merkle trees[11]. Node operators may charge for carriage of such validation across the network.

#### 3.5.2 Light Clients

Light clients have the property to work without having to download entire blocks. In the paradigm of weak subjectivity[12] the user provides only the hash for the fork he wants to synchronise his client with, allowing the client to download forks with the provided hash in it. The client only downloads the block headers which are much lighter compared to entire blocks. Block headers contain the hash of the pervious block and the root hash of all state trees.

#### 3.5.3 Performance and Network Throughput

Variables defining the protocol are constantly synchronised with the consensus. From the default values we deduce the default rate of transactions per second.

$$
\begin{aligned}
B &= \text{block-size in bytes} && (15)\\
F &= \text{blocks until finality} && (16)\\
T &= \text{time until finality in seconds} && (17)\\
S &= \text{transaction size in bytes} && (18)\\
\frac{\text{Transactions}}{\text{seconds}} &= \frac{B}{T} \cdot \frac{F}{S} && (19)\\
B &= 1000000 \text{ bytes} && (20)\\
&= 1 \text{ mega byte per block} && (21)\\
F &= 24 \cdot 60 \cdot 3 \text{ blocks per day} && (22)\\
T &= 24 \cdot 3600 \text{ seconds per day} && (23)\\
\frac{T}{F} &= 20 \text{ seconds per block} && (24)\\
S &= 1000 \text{ bytes per transaction} && (25)
\end{aligned}
$$

Operating a node requires storing a duplicate of all blocks since finality. Under attack it is required to store a 100 times more information. Assuming that finality is reached in 2 days, this would require processing 8640 blocks until finality. As each block is 1 megabyte in size, this would amount to a total of 8.64 gigabytes under regular operations, and to 864 gigabytes in an under-attack-scenario.

# 4 Applications

## 4.1 Blockchain

The Xetion blockchain common modules such as XET tokens, wallets, names and corresponding functionality.

#### 4.1.1 Identity

Every account has its own unique ID number string. In addition, users can register names that are unique and link the same to their accounts, SCTAs and derivatives in the Merkle-root of the entities data structure. In addition to unique names, additional information about an entity can be added. Xetion will use schema.org's JSON format[13] to represent entities of various types (personal, corporate etc.).

#### 4.1.2 Wallet

Wallets are applications that allow users to interact with Xetion. Most importantly a wallet holds private keys to XET tokens, SCTAs and other entities which are owned or mandated by a user on Xetion, and can sign and authorise transactions, induced transactions and emittance of SCTAs and derivatives. Further, the wallet features notifications and allows to submit votes for governance related proposals.

#### 4.1.3 Proof of Existence

Participants in the network can utilise the headers to validate existence of data at the given point in time by publishing the corresponding hash.

[11] *Adem Efe Gencer, Robbert van Renesse, Emin Gün Sirer "Short Paper: Service-Oriented Sharding for Blockchains"*. 2015. URL: `http://fc17.ifca.ai/preproceedings/paper_73.pdf`.

[12] *Vitalik Buterin "Proof of Stake: How I Learned to Love Weak Subjectivity"*. 2014. URL: `https://blog.ethereum.org/2014/11/25/proof-stake-learned-love-weak-subjectivity/`.

[13] *Schema.org "Schemas"*. 2016. URL: `http://schema.org/docs/schemas.html`.

## 4.2 SCTA Applications

Being essentially combinatorial bundles of coins that are managed by terms of a smart mandate on the Xetion blockchain, the use cases and implications of SCTAs are far reaching both for parties actively using Xetion, and for the entirety of decentralised markets, as efficiency and stability can be enhanced by a more permeable diffusion of capital across different chains and batch packet transactions that foster greater equilibrium proximity.

### 4.2.1 SCTAs as Crypto Investment Funds

The most obvious use for SCTAs emitted on Xetion is to create an investment fund consisting of multiple crypto coins. In this scenario the emitter provides the investment strategy in return for commissions in XET tokens (if successful), while users essentially allocate capital to the emitted SCTA in order to participate in the strategy and thereby profit from the knowledge of the emitter. Both parties participating in SCTA interact trustlessly on the Xetion blockchain operating such mandated investments (without compromising actual ownership of tokens). Further, the asset is transferrable or can be liquidated any time.

### 4.2.2 Diversifications through SCTAs and Derivatives for Hedging

Larger organisations can leverage SCTAs to diversify capital in crypto currencies that are of (potential) strategic importance to them and their stakeholders. An SCTA might be further useful to modify large allocations of funds gracefully and ease random volatility losses. Derivatives can be used for hedging in providing a quasi-insurance for unforeseen market ruptures, or by amplifying peak gains.

### 4.2.3 DSCTAs for Automation

Dynamic SCTAs have an almost infinite versatility as they can automatically execute token ratio allocation. A DSCTA could be used for automated trading strategies, offered for greater participation (and thus extending capital base and amplify gains).

As a DSCTA can self terminate it could be used for liquidity optimisations of tokens used to exchange services, for example of various IoT services. Naturally the demand of tokens of other blockchains could vary greatly relative to or interdependent from each other (as, in reality, peak usage of services could signal scarcity of resources at a certain point in time and be interrelated if entities exchange tokenised services). In such a scenario a DSCTA could function as a (temporary) smart reserve system, benefitting the crypto ecosystem by providing affordable liquidity at peaks, while participating parties and the emitter of the DSCTA profit from high demand of the respective tokens (which leads to increase of price of the tokens and subsequently to gains in the DSCTA).

By making use of oracles token demand fluctuations could be leveraged even further by an SCTA in order to increase gains, while at the same time provide a kind of smart reserve and balancing force for tokens of different blockchains that are exchanged and are either in excess or in scarcity, and thus help foster price stability in cross-chain relations.

### 4.2.4 Smart Markets

SCTAs could optimise markets at large scale by processing transactions in combinatorial batches of matrices instead of single pairs. Exchanges or marketplaces accepting multiple currencies and having to cope with high trading frequency could use SCTAs to optimise markets in overall terms, making transactions more efficient and increasing network throughput, and scale mechanical arbitrage on price consolidation.

### 4.2.5 SCTA Trading

Allocated positions of SCTAs in accounts can be traded peer-to-peer. Market-making for SCTA positions can lead to prices exceeding their nominal value if the strategy of an SCTA is expected to (continue to) be successful, essentially speculating on future aggregate performance and returns of an SCTA. Nominal values dont play as much a role as the token ratio matrix within an SCTA is subject to strategic change. In this context pricing of an SCTA in trading might not necessarily reflect its current set and ratio of tokens, but the ability of the SCTA and the mandate to manage the aggregate allocation for future gains (which involves modifying the token ratio and allocation of an SCTA).

#### 4.2.6 Aggregate Portfolio

Walltes on Xetion can show aggregate portfolio valuation and respective metrics, summarising all SCTAs held in the wallet. Aggregate performance can be broken down further by emitter, allocation in tokens of various types, and visualised correspondingly.

#### 4.2.7 Oracles

An SCTA can further be an oracle for cross-chain liquidity, volatility, dispersion of tokens and a host of other potential variables and metrics. This in turn could be used to further optimise an SCTA and derivatives, or to emit new SCTAs aligned with predictions derived from oracles.

#### 4.2.8 Compound SCTAs

While this is not entirely feasible within the current scope and architecture of Xetion, SCTAs could be enhanced further in order to be linked together as chains, or be engulfed and nested into each other. Especially combining different types such as a (master) SSCTA with linked or engulfed DSCTAs could lead to potentiated optimisation of the balance of diversified reserves of tokens with means to exploit volatility and peaks without compromising overall integrity of portfolios.

#### 4.2.9 Research and Analysis

As a whole SCTAs on Xetion would build a clustered landscape of combinatorial bundles of coins in various combination, of which some are subject to constant change in allocation ratio. Such complex networks of clusters and dynamic inter-chain relations could be analysed further and research on the overall dynamic and various aspects of network interactions could be conducted, and potentially be used to create novel and more efficient SCTAs.

#### 4.2.10 Liquidity, Automation, AI

Conventionally liquidity can be expensive to provide in decentralised networks. By employing SCTAs liquidity can be swapped more effectively between networks, while such swapping should lead to returns derived from combinatorially relative fluctuations in return for providing the liquidity. Essentially this would mean to partially automate market dynamism and foster availability of liquidity. AI and machine learning could possibly be used to anticipate needs for liquidity and balance the same for decreasing needs for liquidity in other networks, which could also allow to dynamically diversify allocated capital.

## 5 Implementation

The current alpha proof-of-concept implementation was developed in Go and includes the blockchain of Xetion, the contract language and governance mechanisms. The VMs are implemented using Java.

For the Xetion core we use Go as the default programming language. The advantage is that Go is not an interpreted language but a compiled language, which massively reduces overhead for lazy bugs prevalent in interpreted languages. As a blockchain needs to be efficient doing cryptographic calculations and process huge amount of data, which it has to propagate as well as store in the network, we believe Go is the right foundation for the task at stake. Ethereum is also implemented in Go, and in general Go has and continues to gain rapid adoption for blockchain applications.

Xetion core is licensed under MIT open source license.

### 5.1 Virtual Machines

Virtual machines on Xetion support macros and variables but execute based on a stack-model. Java is used as the main language since it is widely adopted in the financial industry and has many libraries that are useful for advanced statistics and complex modelling.

### 5.2 Design and User Experience

Xetion features wallet and UI that is highly optimised to visualise complex data in an easy-to-comprehend UI which has a well differentiated information architecture and easy-to-read typography.

Beside the platform-related UI, Xetion can generate widgets for SCTAs that can be embedded on websites and show SCTA abbreviations, graphs with performance overview and a call to action leading back to the SCTA on Xetion.

## 6 Conclusion

Xetion introduces a protocol that allows users to allocate and diversify capital in structured assets that are combinatorial bundles of crypto coins and tokens, which are mandated on-chain. This benefits the emitter and the holder of such assets by offering highly effective diversification strategies on a secure, scalable and decentralised network in return for commission on success, while optimising overall market efficacy, liquidity and throughput across networks at global scale.

### 6.1 Discussion

We are aware that creating truly decentralised smart markets is ambitious, yet likely necessary for blockchain applications acting within greater ecosystems. Various other projects currently pave the way for cross-chain operation, among others Cosmos[14] and Plasma[15]. We therefore believe that, albeit connected to challenging problems, more permeable cross-chain environments are indispensable for the future of blockchains and decentralised technologies and markets.

Xetion has proposed a number of procedural improvements to alleviate network liquidity. However, true scarcity at source of a blockchain might still lead to liquidity for certain tokens, especially when a token is newly introduced. On the other hand, liquidity is a general problem and alleviating network efficiency can still contribute to free liquidity, significantly.

[14] *Jae Kwon, Ethan Buchman, "Cosmos A Network Distributed Ledger".*

[15] *Joseph Poon, Vitalik Buterin, "Plasma: Scalable Autonomous Smart Contracts".*

## 7 Acknowledgements

We thank all the proof readers for giving us a hand in making this paper as concise as possible. In particular we would like to mention and thank Robert Brown and Norman Theissen for their efforts and ideas.

## Acronyms

**SCTA** structured crypto token asset. 2–9, 11–14

**XET** Xetions token for all transactions on Xetion. 3, 7, 8, 10, 11

## Glossary

**account** An account with a unique address and private key on a blockchain. 3–7, 10, 11, 14

**blockchain** A distributed ledger database, defined by a list of hash-linked blocks. 2–4, 7, 9–11

**consensus** The technical protocol for verifying computations on a blockchain. 3, 4, 7–10

**governance** The rules according to which agreement on (future) changes on the core system consisting a blockchain can be reached. 2, 6, 9, 10, 12

**hash** A cryptographic function that takes binary input and gives an output of a fixed size, of which it is not possible to deduce the input. 3–7, 9, 10

**hashlocked** Locking a specific hash between multiple chains and channel until a conditions (a transaction) is met. 6

**liquidity** Availability of tokens in a blockchain that have been mined and can be transacted. 2–8, 11–13

**merkle tree** A hash based data structure that is a generalisation of the hash list. 3

**oracle** An agent that finds and verifies occurrences and submits this information to the-blockchain. 11, 12

**participant** A party that allocates capital to an asset. 7–10

**token** A representation of balance in a blockchain system, for which services can be availed. 2–13

**token ratio matrix** A matrix defining token ratios within an SCTA. 3, 5, 7, 11

**transaction** Shifting tokens between accounts on a blockchain. 3–11, 14

**wallet** An application holding one or multiple private keys for accounts on the blockchain. 5, 6, 10, 12, 13

# List of Figures



# References


*Adem Efe Gencer, Robbert van Renesse, Emin Gün Sirer "Short Paper: Service-Oriented Sharding for Blockchains"*. 2015. URL: http://fc17.ifca.ai/preproceedings/paper_73.pdf.

*Alessandro Chiesa, Eran Tromer, Madars Virza "Cluster Computing in Zero Knowledge"*. 2016. URL: https://eprint.iacr.org/2015/377.pdf.

*Asset & Wealth Management Insights Asset Management 2020: Taking stock*. 2017. URL: https://www.pwc.com/gx/en/asset-management/asset-management-insights/assets/am-insights-june-2017.pdf.

*Casey Detrio, "Smart Markets for Stablecoins" 2016.* 2016. URL: http://cdetr.io/smart-markets/.

*Jae Kwon, Ethan Buchman, "Cosmos A Network Distributed Ledger"*. 2017. URL: https://cosmos.network/about/whitepaper.

*John Tromp, "Cuckoo Cycle: a memory bound graph-theoretic proof-of-work"*. 2014. URL: https://eprint.iacr.org/2014/059.pdf.

*Joseph Poon, Thaddeus Dryja, "The Bitcoin Lightning Network: Scalable Off-Chain-Instant Payments"¡Paste¿*. 2016. URL: https://lightning.network/lightning-network-paper.pdf.

*Joseph Poon, Vitalik Buterin, "Plasma: Scalable Autonomous Smart Contracts"*. 2017. URL: https://lightning.network/lightning-network-paper.pdf.

*L.M Goodman, "Tezos – a self-amending crypto-ledger White paper"*. 2014. URL: https://www.tezos.com/static/papers/white_paper.pdf.

*Leemon Baird, "The Swirlds Hashgraph Consensus Algorithm: Fair, Fast, Byzantine Fault Tolerance"*. 2014. URL: http://www.swirlds.com/downloads/SWIRLDS-TR-2016-01.pdf.

*S. Nakamoto, Bitcoin: A peer-to-peer electronic cash system*. 2008. URL: https://bitcoin.org/bitcoin.pdf.

*Schema.org "Schemas"*. 2016. URL: http://schema.org/docs/schemas.html.

*Vitalik Buterin "Proof of Stake: How I Learned to Love Weak Subjectivity"*. 2014. URL: https://blog.ethereum.org/2014/11/25/proof-stake-learned-love-weak-subjectivity/.