Deliverable 4 Proof – Transport Advisory

KIC project the report results from	*Blockchain Solution for Incentivising Low-Emission Transportation (LET-Chain)*
Name of document	Transport Advisory Report
Summary/brief description of document	Collects feedback on LET-Chain Architectural Blueprint
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**Supporting documents:**

Report

31.12.2017

Transport Advisory –
Expert Feedback on the LETChain Architectural Blueprint

ETH Zurich has identified relevant experts in the fields of blockchain, finances, sustainability and government to comment on the LETChain Architectural Blueprint.

In short, the Architectural Blueprint[1] states that the LETChain could be coded on the Ethereum blockchain, using the smart contracts mechanism.

The example process looks like this:

1) A corporation associates a given amount of FIAT money (currency issued and by a state) to an employee as an incentive and informs the admin (see p.4 for a description of the administrator).

2) The admin issues the equivalent amount of token (exchange rate Token : FIAT = 1:1) to the incentivized employee.

3) The employee spends the token to buy goods from a supported vendor (e.g. electrical power for cars or public transportation vouchers).

4) The vendor wants to change the token back into FIAT money and informs the admin (or makes a transaction to the admin).

5) The admin burns the token from the vendors account and writes a bill for the corporation.

6) The corporation pays the bill to the vendor out of the associated FIAT money.
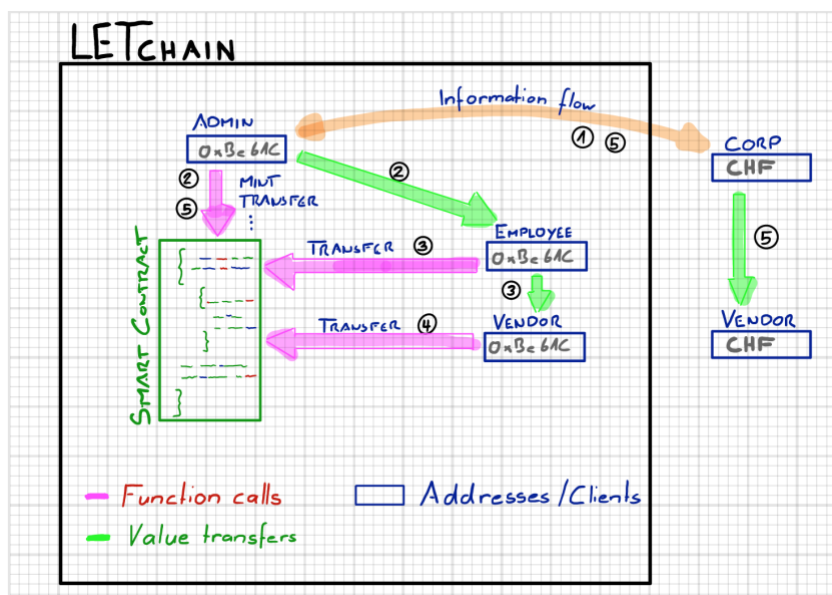
Graph 1: LETChain Design

[1] See separate document on the LETChain Architectural Blueprint

Experts Feedback

The following experts have been invited to comment the blueprint:

First Name	Surname	Title	Affiliation	Country
Alan	Kirman	Professor, Director of Studies	School for Advanced Studies in the Social Sciences Paris	FR
André	Wolke	Founder & CEO	Validity Labs	CH
Andreas	Iten	Co-Founder, Member of the Board	F10 Fintech Incubator	CH
Andreas	Sprock	Head Group Innovation	SIX Group	CH
Anne	Wolf	Leiterin Corporate Responsibility	Swiss Post	CH
Axel	Apfelbacher	Executive Consultant Fintech	Accelerator Frankfurt	DE
Chang-Won	Ahn	Special Fellow, Future Technology & Strategy Research Lab	Electronics and Telecommunications Research Institute	KR
Christiane	Edler	Geschäftsführerin	Cquadrat	DE
Christophe	Scheidhauer	Attaché to the CEO	Greater Paris Investment Agency	FR
Claudio J	Tessone	Assistant Professor of Network Science	University of Zurich	CH
Daniel	Heller	Visiting Fellow	Peterson Institute for International Economics	US
Jeremy	Wood	CSO	IOHK	HK
John	Hucker	President	Swiss Finance & Technology Association	CH
John	Prpic	Professor	Thompson Rivers University	CA
Kerstin Tina	Ehrke-Rabel	Professor, Director Institute of Tax and Fiscal Law	University of Graz	AT
Laurent	Leloup	Co-Founder & President	France Blocktech	FR
Martin	Diehl	Head Payment System Analysis	Deutsche Bundesbank	DE
Martin	Rindlisbacher	Executive Director, Group COO	UBS Business Solutions AG	CH
Michael	Lewrick	Chief Innovation Officer	Swisscom Enterprise Customers	CH
Nick	Beglinger	CEO	Cleantech 21	CH

Paolo	Tasca	Executive Director	UCL Centre for Blockchain Technologies	UK
Peter	Buhler	Manager, Cognitive Computing and Industry Solutions	IBM Research	CH
Richard	Hellen	Director and Trustee	The Schumacher Institute	UK
Rino	Borini	Co-Founder & CEO	Financialmedia	CH
Stefan	Bergheim	Director	Center for Societal Progress	DE
Thomas	Boceck	Head of P2P and Distributed Computing	University of Zurich	CH
Thomas	Dapp	Head of Think Tank / Digital Office	KfW Group	DE
Timo	Ali-Vehmas	Head of Ecosystems Research	Nokia Technologies	FI
Tommy	Back	Managing Partner, Business Innovation & Technology	Blockchain Source GmbH	CH
Vahan P.	Roth	Independent Finance Consultant		CH

The main comments shared by the experts have been addressing the following points:

Overall Idea and Architectural Design

The project has been regarded with favor by the experts. It has been explicitly noted that the proposition remains interesting as a voluntary mobility measure for engaged companies, governments and other employers.

The execution on the Ethereum platform has been welcomed and seen as a "straight forward choice", with all the pros and cons. Transaction costs have to be taken into account as they could pose a financial burden on the project. What also remained unclear up to this point of development is the question about whether the system will run on the Ethereum main net or a test-net or a private deployment.

It has been recommended to get a few interested companies on board as early as possible.

On the critical side, it has been noted that the project only marks the start of a larger development as smart contracts are only a small part of the technical architecture of a decentralized application (dapp). Questions that need to be addressed are:

- How do end users interact with the smart contract?
- How does the stack of the dapp look like?
- Will there be a website and/or a mobile app? And what functionalities do they provide to end users?
- How does the mobile app securely communicate with the dapp?
- What kind of data is processed and where is it stored?

Tagging the LETCoin to fiat currency
It has been mentioned that a 1:1 tagging between LETCoin and fiat money is not as straightforward as one might think. Especially, there is a need to have provide massive amounts of both crypto tokens and fiat money to guarantee the liquidity of the system and to manage a floating exchange rate.

Another comment concerns the choice of fiat currency to tag the token against. It has been noted that it would be extremely difficult to hedge against each and every fiat currency at the same time.

Wallets / Storage of the LETCoin
The choice of cryptocurrency wallets to use for storing the LETCoin is another important question that has been raised. Right now, there is not a single 100% secure Ethereum wallet available. How can this be overcome? What are the legal consequences for LETChain and what are future technological developments that can be expected?

Token Generation Event / Token Design
One commenter would like to see more information about how the LETCoins are generated or "mined". As the paper seems to suggest a pre-mine: How many tokens will be "premined"? How will they be distributed? And who is the owner of the smart contract?

It has also been noted that it is not clear whether the list of functions on pages 4+5 will be ERC20-compliant[2]. Even if it is not mandatory to adhere to standards, a deviating design should be explained as it has implications for fungibility and future interactions with different tokens in the Ethereum ecosystem.

Role of the Administrator in LETChain
It has been criticized that the central administrator to some extent contradicts the whole idea of a blockchain. The question has been raised whether a blockchain would be the right solution. One could also consider to use a simple centralized platform.

Other commenters raised questions about this central role as well, e.g. Who will have this role? What powers does it have? How can malicious actions be discovered and what are countermeasures? What other roles are there?

"Burning" or Destruction of LETCoins
Further comments concern the idea of "burning" coins in the system. Some commenters claimed that this concept is not sufficiently explained in the blueprint and that they are therefore not able to judge the technical feasibility of the process of burning coins. So, it was recommended to elaborate on how this process is supposed to work in a blockchain. One suggestion was to send coins to an address which no one has the private key of.

Other commenters raised the question about the rationale behind this process. To them it remained unclear why some coins should be burned at all.

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[2] ERC20 refers to a token standard that is used for Ethereum smart contracts. It defines a common list of rules that an Ethereum token has to implement.

General Data Protection Regulation (GDPR)

It has also been suggested to thoroughly check compliance with the EU General Data Protection Regulation GDPR. Notably, the question whether GDPR's stipulation of the „right to be forgotten" can be implemented in a blockchain environment. Blockchains are generally based on the principles of transparency and immutability and this could be in opposition to some privacy rights.

Use Cases

It has been noted that, as a next step, use cases for the LETChain have to be developed. Which use cases does the system need to implement? Who are the different users of the system and what are their roles? Do we need to consider different access levels? And who can earn LETcoins, and how, and for what can they be spent?

Lessons Learned

Taking into account the several helpful and well-elaborated comments from our highly respected commenters, we have drafted a list of points that we will have to clarify throughout the further development of LETChain:

- Provide a deeper context to the reader what the idea behind LETchain is.
- Provide a use case diagram (UML or other) that shows all stakeholders, how they are involved, their roles, and key use cases.
- Provide a technology stack diagram showing the various components (e.g. storage, mobile app, etc.) that are involved and which technologies are used for implementation.
- Provide more context to describe the incentive system: Why should people use the system and keep using the system regularly? Based on that, we should describe the cryptoeconomic design (even if it is rather basic), so that future users as well as implementers know the mechanisms of the system.
- Provide arguments why a mint/burn-approach to continuously allow fiat-crypto-exchanges has been chosen as the preferred design while many projects – especially in the Ethereum ecosystem – actively explore circular economic designs where the token stays alive inside the system by circulating between the different stakeholders, thus implementing the incentive system.

Summary

The experts' feedback has proven to be very valuable for the further development of LETChain. It has raised new questions to be addressed and ideas to be specified (see list above). We thank our reviewers for their time and support.