

IBISA development approach by Mockups (WiP)

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Index of Content

1 Executive Summary 4

1.1 Presentation of IBISA 4

1.2 Frequently asked questions 4

2 IBISA project management approach 5

2.1 IBISA use of GIST 5

2.2 IBISA develops progressively by mock-ups 6

2.3 IBISA integration plan 6

2.4 IBISA software engineering tools 6

3 Specification of IBISA mock-up DApps 7

3.1 Mock-up 1: the mutual risk sharing mechanism 7

3.2 Mock-up 2: the watchers at large 7

3.3 Mock-up 3: merge watchers with an example of actual risk 7

3.4 Mock-up 3: merge users and watchers 8

4 Mock-up 1: DApp design and implementation 8

4.1 Overall Design 8

4.2 Detailed design of the mock-up 1 to be continued 9

5 More mock-ups 9

**Change Record**

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| --- | --- | --- | --- |
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| 2018-01-11 | 0 | 0 | Initial draft |
| 2018-01-23 | 0 | 1 | Change the descriptions of DApp |
| 2018-03-06 | 0 | 2 | Change the description of workflow |
| 2018-03-19 | 0 | 3 | Rewritten |
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1. Executive Summary

Disclaimer: please consider this document as a work-in-progress. The exercise is to produce a text similar to a software specification, but we use an Agile approach to build IBISA and nothing is written in stone: all clauses are subject to change during the progress of the reflection.

The purpose of this document is to document the development process used for IBISA.

Developing IBISA is challenging because IBISA breaks ground in many aspects:

* The business process of risk sharing is ancestral, but its use at a worldwide scale and using blockchain has never been tried and documented, so we need to be flexible to adapt the process
* The development team is scattered worldwide. In March 2018 there is a team in Luxembourg, a team in Gujarat (India), a team in Moscow (Russia), one individual in HCM-City (Vietnam) and it can be growing, a possible team in The Hague (Netherlands), a possible team in Denver (USA) etc.
* The development environment of each team is different from the others, as well as the practices.

The choice of the blockchain (Ethereum, Hyperledger Fabric or other) is not yet definitive and the architecture of IBISA expects that several IBISA on different types of blockchains will be interoperable, i.e. the values of the tokens will be maintained across blockchains.

* 1. Presentation of IBISA

IBISA means ***I****nclusive* ***B****lockchain* ***I****nsurance using****S****pace* ***A****ssets*.

Since this architecture document is internal to the project, we assume that the reader knows about IBISA purposes and goals. If not please refer to other project documents, for example the Architecture document. Alternatively read the FAQ below.

Technically speaking, IBISA uses the blockchain technologies for the following functions:

* Peer-to-peer sharing of crop risk due to weather or pests and to indemnify the victims;
* Assessment of eventual damages by “wisdom of crowds” based on freely available data, especially Earth Observation data.

IBISA relies essentially on the low cost of transaction of the blockchain.

* 1. Frequently asked questions

What is IBISA?

IBISA is an agriculture risk sharing service, mutualised worldwide among poor farmer who have a revenue of around 1 or 2 USD per day.

What is the value of IBISA?

IBISA solves the issues that limit the growth of Micro-Insurance, which is considered by poor farmers as very useful but too expensive. Such insurances exist only where they are largely subsidized by the government. For example, PROPAGRO in Brazil, INS in Costa Rica, CCIS in India, ANAGSA and the FONDEN programme in Mexico, PCIC in the Philippines, Agroseguro in Spain, and FCIC in the USA, for which every respective government pays for more than half of the premiums.

What is the value of IBISA for farmers?

IBISA brings low cost service, quick loss assessment and fast pay-out.

What is the value for Bitbank and for early partners?

1. Bitbank and its partners, acting as initiators of the service, can monetize the utilities tokens created for IBISA
2. Bitbank and its partners, acting as stakeholders of the ecosystem, are rewarded as such, for rendering IBISA services
3. Because the system is decentralised, the cost of operations is minimal for Bitbank and its partners
4. The know-how can be monetized to help other stakeholders when they come.

How is it possible?

1. Because of the low cost of transaction of blockchain, favourable to peer-to-peer payments
2. Because of the free availability of Earth Observation satellite data, favourable to crop assessment
3. Because of the immutability of blockchain, favourable to fair and transparent governance

What technologies are used and why IBISA can succeed?

1. Mutual Insurance technologies and expeience: represented in IBISA by Annette Houtekamer and by 2 world scale NGO’s (FHI360 and ADA-Micro-finance)
2. Blockchain, System design and Earth Observation: represented in IBISA by Vu Tien Khang
3. Blockchain token and economics: represented in IBISA by María Mateo Iborra
4. Blockchain Network and Cyber-security : represented in IBISA by Jesús Peña Garcia
5. More and more people are joining the move.
6. IBISA project management approach

Although each the technologies that is used has been successfully demonstrated in other fields, IBISA is ground-breaking in every facet of its operation.

* Risk sharing peer-to-peer micro pay-out in a large population
* Assessing damages using wisdom of crowds
* Risk sharing on index-based risks for tropical crops
* Risk sharing governance across different cultures
* User experience interface adequate with a multitude of other social network and incentive tools
* etc.
  1. IBISA use of GIST

Because of the diversity of team cultures, its discover-as-you-go nature and its decentralised approach, IBISA will be managed using the Google GIST planning methodology of Google (**G**oals, **I**deas, **S**tep-projects, **T**asks).

<https://hackernoon.com/why-i-stopped-using-product-roadmaps-and-switched-to-gist-planning-3b7f54e271d1>

* Examples of goals:

Take the advantage of the event of ESA in the London Stock Exchange, 20 April, to raise interest and attract Venture Capitalists

Raise minimum 500K€ to 1.2 M€ of seed capital end of July 2018

Have a MVP (Minimum Viable product) for limited deployment Q3 2019

* Examples of Ideas (ideas how goals may be reached)

Use the event of ESA as a check-point to develop some mock-ups and some front-ends

Raise interest of VCs who target social impact projects, they might be less demanding on RoI

Partner with some infrastructure blockchain project to bring them IBISA as highly visible application against technical support (Gnosis platform, Cosmos state channels)

Transfer the software architecture tasks to newly on-boarded architects to be able to focus on the challenge of risk sharing modelling

Bundle IBISA with other products (micro-loans, fertilizer programs, civil service in exchange of premiums)

* Examples of Step-Projects (projects implement the same idea in parallel, the most promising implementation wins and the others are dropped)

Projects pursue VCs in different

Projects implementing the IBISA functions in parallel in different blockchains (Ethereum, APLA, Fabric) as each team prefers

Projects implementing look-and-feel front-ends to test several ideas of business process

Bibliographical projects to evaluate success of past field deployments of micro-insurance

* Examples of tasks in each step-project

Task of implementing main flow

Task implementing the watcher’s workflow

Task modelling the risk in 2 prominent crops in 2 countries belonging to 2 weather zones

* 1. IBISA develops progressively by mock-ups

By consequence, nothing is written in stone. IBISA will be changing a lot at every stage and even between the MVP (Minimum Viable Product) and the first fully deployed product.

To start with, IBISA would be implemented in several distinct mock-ups, one for each facet of IBISA. When the mock-ups achieve a satisfactory state, they can be merged into a Proof-of-Concept (PoC). When we exercise the PoC and find some specific points of improvement, we’ll implement the improvement in the corresponding mock-up before merging it in the PoC. In this manner, the PoC will evolve into a prototype, then into a MVP and into a first deployed product.

Here is a list of mock-ups of the blockchain infrastructure components, for this stage:

* one mock-up to show the mechanism of risk sharing, the users contributing and the peer-to-peer pay-out, with a dashboard to show the mechanism
* one mock-up to show the damage assessment, with the voting mechanism polling all the answers of watchers
* one mock-up with one or several models of crop risk.

Here is a list of mock-ups of the user interface, for this stage:

* one mock-up to show the user interface UX of a watcher
* one mock-up to show the UX of an user (the marketplace of different risks to subscribe to, and the wallet with one compartment per "agreement")
* one mock-up to show the system dashboard

For the target meetings with investors in April, we can consider making one blockchain mock-up and one or several U/X mock-ups.

* 1. IBISA integration plan

The following drawing is a proposed decomposition of IBISA functions in several mock-ups that are progressively integrated into a MVP.

Each mock-up has a different level of complexity. Each can be allocated to one or several parallel development teams who must commit to a certain time line. In addition, each team would design its implementation plan so that to give visibility to the rest of IBISA during the development. The usual practice in Agile development is to have a showable demo every 2 week, maximum 3.



* 1. IBISA software engineering tools

Draft ideas, to be clarified and confirmed with Microsoft.

Each team would have its own github and there is a project IBISA github.

Regularly, the responsible of each team would issue a “pull request” to the IBISA project of its master, in an debugged and tested state. Each github would have the code and all documentation and tests.

IBISA has a Microsoft-sponsored Azure account: the IBISA project would generate on Azure a working dApp from each team’s master. Each team will be able to show his work and the others on IBISA, worldwide and 24/7 at the best network throughput.

1. Specification of IBISA mock-up DApps

*Short intro: in Ethereum, a DApp is a decentralised application. It is composed of a HTML/ JavaScript part that uses* [*Web3 Javascript API*](https://github.com/ethereum/wiki/wiki/JavaScript-API) *to make calls directly from Javascript to the Ethereum blockchain. We use the word DApp here regardless of Ethereum or Hyperledger Fabric.*

In this chapter we will specify a simple set of stories for the demonstrator to evaluate Ethereum. In the next chapters, we’ll detail more the design of each mock-up.

* 1. Mock-up 1: the mutual risk sharing mechanism

**Scenario**

This demo is used to show the principle of mutual risk sharing: contribution and indemnity payment. The architecture is described in detail in the Architecture document, section 7.

The functions described are:

* On-boarding users
* Subscription of a risk-sharing agreement
* Calculation of merit at each contribution and calculation of pay-out
* Actual pay-out to a “withdrawal wallet”

**Simple demo mock-up 1a: the main flow**

See description below

**Simple demo mock-up 1b: the read-only regulator dashboard (users)**

Description to be done.

**Simple demo mock-up 1c: user on-boarding mechanism (most probably seen by enabler)**

Description to be done.

**Simple demo mock-up 1d: user premium contribution using mobile money (most probably seen by enabler)**

Description to be done.

* 1. Mock-up 2: the watchers at large

It is not well detailed yet: WORK IN PROGRESS.

This mock-up is used to show the principle of watchers. The watchers are equivalent to the “council of elders” in villages, who decides on the damage and the indemnity of each victim based on each merit.

The network is composed of "watchers" who contribute to a consensus on the occurrence of a damage to be compensated. The consensus is a weak majority voting: watchers may choose not to vote.

The governance of watchers is to be defined by variations of this demo. The general idea is that each watcher will be rewarded by a number of tokens that depends on:

* Correctness, i.e. matches the consensus
* Stake in the system, represented by another token
* etc.

In this mock-up we explore the mechanism of voting and collective evaluation. It will be complemented by some Monte-Carlo simulations using the open-source available on github.

* 1. Mock-up 3: merge watchers with an example of actual risk

It is not well detailed yet: WORK IN PROGRESS.

This mock-up is used to show the interactions between the mechanism of watchers and the actual profile of weather.

* 1. Mock-up 3: merge users and watchers

It is not well detailed yet: WORK IN PROGRESS.

This mock-up is used to show the interactions between the 2 communities of users and watchers.

The blockchain network is now a merge of users and of "watchers". It is meant for the dashboard will simulate et large number of users, maybe 100 users, and a smaller number of watchers, a dozn.

Because of the number of users, each will be shown in the hub screen as a coloured polka dot. The watchers will be a matrix of icons as in the previous mock-ups. The whole process is more or less automatic. The details still have to be written.

1. Mock-up 1: DApp design and implementation

This mock-up 1 has no user on-boarding, no risk subscription. We assume a number of users already on-boarded and already subscribed to share a risk. It has only the calculation of merit in a contribution and the pay-out mechanism (simplified to meet the date of 20th April).

For the purpose of a demo of IBISA, it has the following facilities that do not exist in reality

* A button to call for contribution. In reality the call is triggered by time
* A means to activate a pay-out. In reality the payout is activated by the vote of watchers.
  1. Overall Design

For the demo, we have a dashboard that displays a number of cards, each representing a crop agreement of a farmer in number of 5 to 8 to populate apage. Each agreement is represented by a card, similarly to [the petShop tutorial of Joshua Quintal](http://truffleframework.com/tutorials/pet-shop). Each card has fields to show (for example) the account number, the “protected” crop risk, the total of the deposit wallet, the merit, the total of withdrawal wallet, GPS coordinates of geographic zone, etc..

A user, in this demo, has the following attributes:

* User blockchain account number: unique identifier, 20 bytes in Ethereum;
* Deposit wallet total: a “deposit wallet” of a *user* is a total value of contributions and this total participates to pay-out other members in need;
* Merit wallet total: a “merit wallet” is a total value of merits acquired by the user;
* Withdrawal wallet total: a “withdrawal wallet” is a total value of pay-outs received from the community;
* ID of preferred *enabler*: to reward a commission on the contributions to the on-boarding *enabler*, who may also support and educate the *user*. It may change if the *user* moves to another location like any local broker in classical insurance
* On-boarding date: to calculate merit
* Date of last contribution: to calculate merit
* Array of risk sharing agreements: for the community to assess losses associated to a given agreement

A risk sharing agreement is composed of:

A hash of the agreement descriptor, possibly a JSON object, used as ID of the agreement

A hash of a geographic zone (latitude-longitude) to which belongs the cultivated field that is covered by the agreement

A hash to profile of crop risk (starting date, duration, ratio between the monthly premium and the payout (see below), and for each segment the ideal index and the 4 index slots for a bad crop)

A maximum payment[[1]](#footnote-1), value given by the user and to which will be compared his merit. If he claims a high payment value and does not contribute in proportion, his merit is low.

* Active or disabled flag: to comply with GDPR right to be forgotten (TBD: might be ignored here and handled at the edge)

For this mock-up, to make community indemnification more realistic there is a special wallet that represents the rest of the community and its field of current total is 10,000 times more that each individual wallet.

We can click on a button to trigger a simulated periodic premium collection on all wallets. Each wallet will increase by the amount stated in the premium. The community wallet will increase by its premium, but which is 10,000 times the average individual amount.

In this demo, we can double click on a agreement of a user to indicate that this agreement is entitled for a calamity indemnity. An event will be generated, the indemnity will be calculated based on the current amount in the agreement of this user as compared to the maximum indemnity and in function of the starting date. It is capped by the maximum indemnity possible as indicated in the agreement. The indemnity will be divided equally between all policies of the same risk. Each agreement will receive the event and will transfer from its wallet the required micro-amount of assets to the wallet entitled to receive the indemnity. We should see the total of the damaged wallet increase of the value of the indemnity.

A indemnity payment event, in this demo, has the following attributes:

Identification of entitled farmer account

Micro-amount of asset to be transferred

* 1. Detailed design of the mock-up 1 to be continued

An user owns only one wallet, which may have several agreements. The ID, name, premium, indemnity, running total of premiums of each agreement are stored in a struct.

1. More mock-ups

WORK IN PROGRESS

1. To avoid cheating from satellite when a user subscribes crop protection for a field that is left uncultivated, we define a zone large enough that a weather index on such zone would average performance of several farmers. For example, a zone of 1 km by 1 km would cover 100 hectares.

   In addition, the maximum pay-out would be limited to the crop value of a few hectares. This is in-line with the purpose of IBISA, which is to do risk sharing among smallholders. [↑](#footnote-ref-1)