

carpETHii

BETH Hackathon 2019

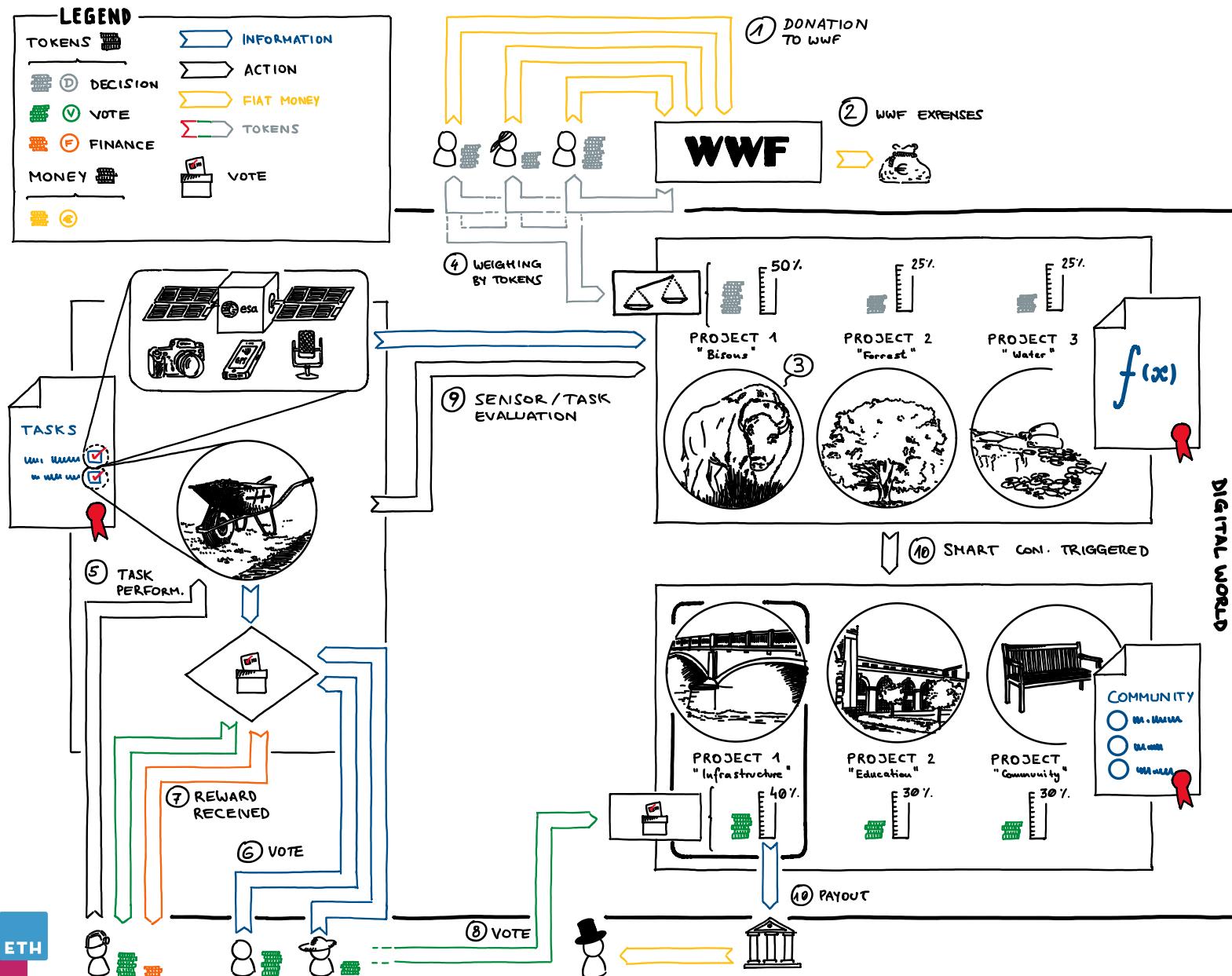
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Marc-Philippe Frey

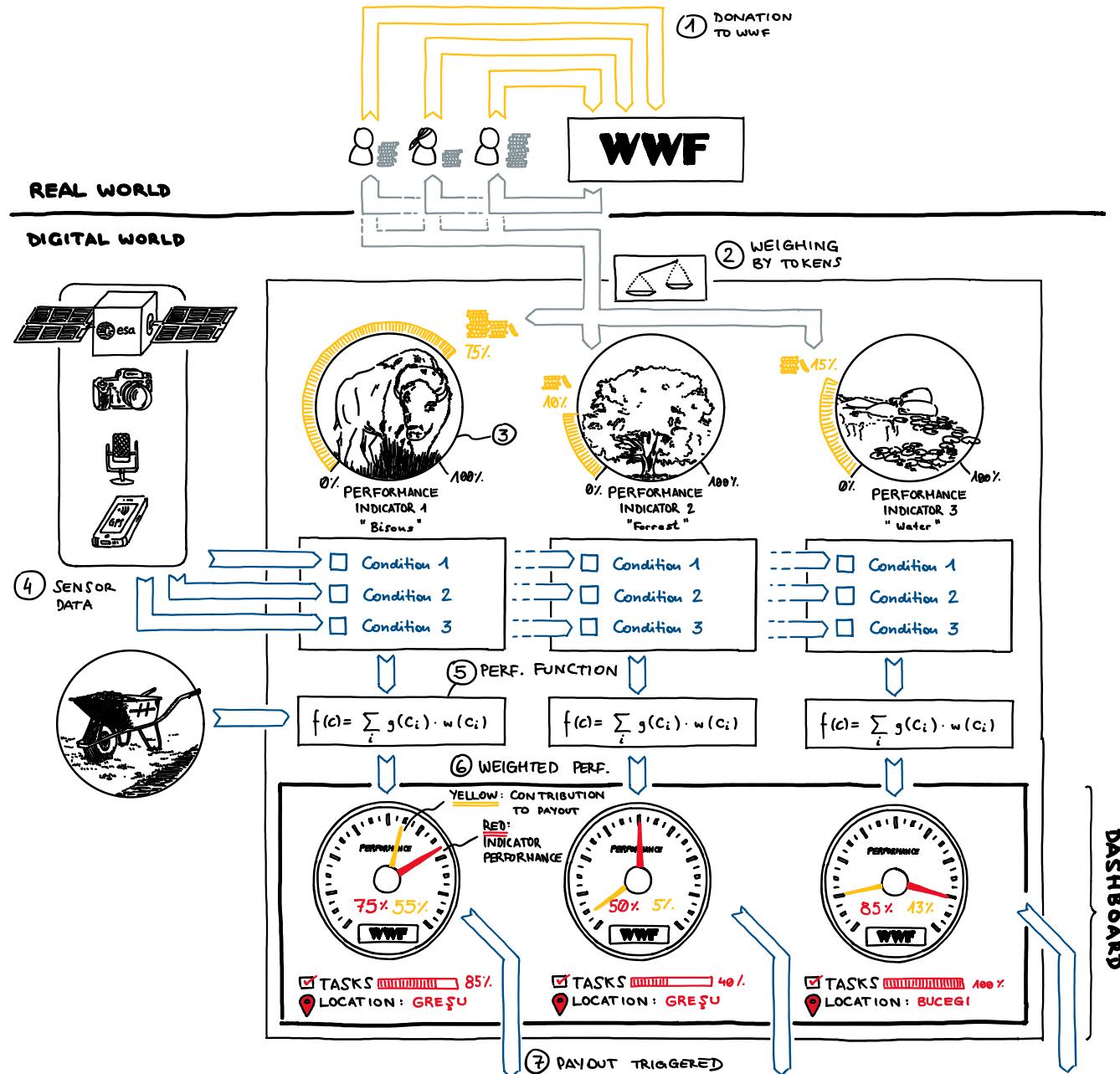
Vladimir Michalec

Michael Weinold

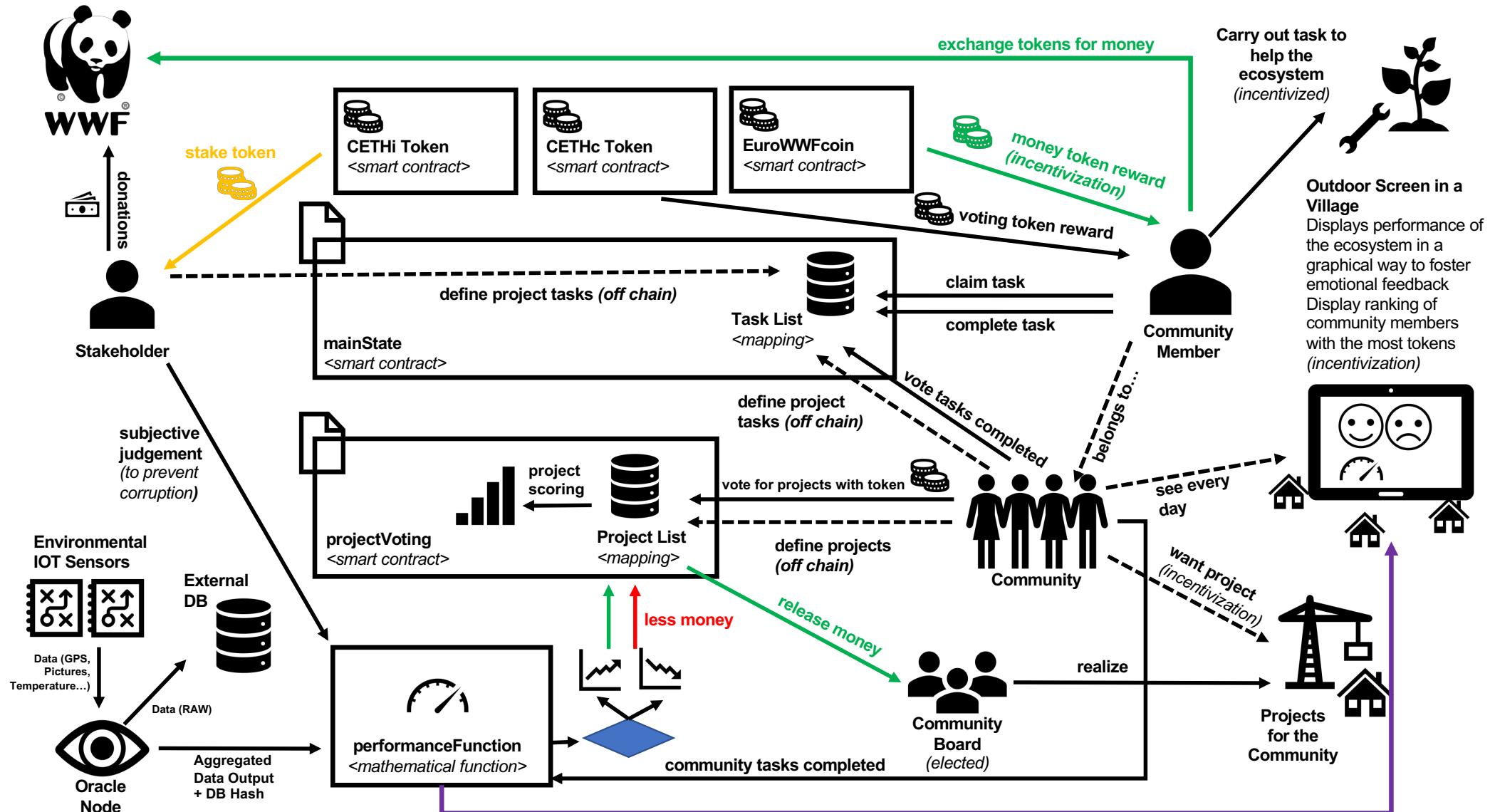
Yoel Zweig



1. Stakeholders donate money to WWF and receive a **Decision Token** in return.
2. WWF splits the money into two pots. One is used to cover the expenses of WWF's activities including bison transportation, set-up of sensors, etc. The remaining money is combined into a community pot on Blockchain.
3. The overall state of the ecosystem is measured through **Performance Indicators** such as the number of bison or the level of deforestation.
4. The Stakeholders distribute their **Decision Tokens** to the projects (=Performance Indicators) that interest them the most, creating a weighting.
5. Community members can register for a given task and complete it. Once the task is completed, there are two ways to verify it. Some tasks are sensor related, others require community validation. Tasks that allow automatic verification, such as through GPS data, get verified automatically.
6. Alternatively, the community votes on the task completion to verify it
7. Through the completion of the task, the community member receives a **Voting Token** and a **Finance Token**. The **Finance Token** is a cash alternative that is redeemed with WWF directly.
8. The **Voting Token** is used by the community members to cast their vote towards a community project they would like to have realized (**Voting Tokens** can only be used once)
9. At regular intervals, sensor and task information are used to determine the health of the state of the environment through a smart contract. The details are explained on the next slide.
10. The determination of the state then triggers the Smart Contract that releases the funds to the most voted community project.



1. Stakeholders donate money to WWF and receive **Decision Tokens** in return
2. Investors allocate the **Decision Tokens** to their desired performance indicator. These votes will then be used as a weighting mechanism for final pay-out of the allocated donations.
3. The overall state of the ecosystem is measured through Performance Indicators such as the number of bison or the level of deforestation.
4. Using sensor data, the 'health' of the Performance Indicators is evaluated against a predefined baseline. This is shown in **red** on the Performance Dial.
5. The Performance Function inside the smart contract uses the 'health' of the indicator, the number of tasks completed by the community, and the weighting assigned by the Stakeholders.
6. The result is the weighted contribution of the indicators. This is shown in **yellow** on the performance dial.
7. This weighted performance determines the subsequent pay-out through the next smart contract shown on the overview slide.



Benefits and Challenges

System Design

- The rewards are divided into short-term rewards and long-term rewards to enable continuous involvement
- Community can define own tasks which will be rewarded as well
- Anyone can claim task and complete it (no hunter/community split)
- Task completion auto-checked or voted by the community (incentive to vote, task completed increases funding)
- All parties incentivized to cooperate (carrying out tasks provides direct reward with right to vote for local sub-community projects / anyone completing task increases the funds for all the projects)
- Transparency on the progress and state of the environment for all stakeholders (can give subjective judgement of the ecosystem)
- The configuration of the state function acts as a watchdog against collusion between community members

Blockchain

- The blockchain technology ensures that the decision making is concentrated amongst the most active members
- Decentralized governance that allows merit-based reward distribution

Off chain

- Provide outdoor screen panels showing current ecosystem performance
- Use graphical representation (smiling/crying bison) to foster emotional response
- Show ranking of the people who have done most tasks (to foster competition for the good thing)

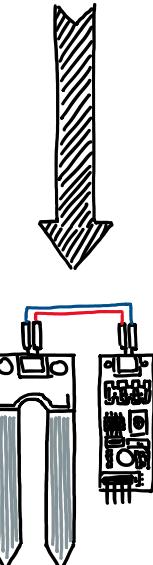
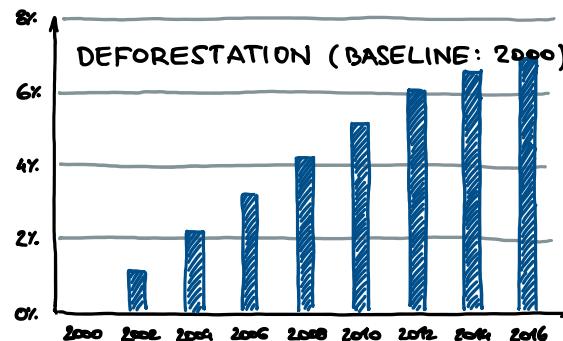
Implementation Challenges

- Validation of the tasks is dependent on the members of the community and can be falsified (if all the sub-communities tried to cheat the system, but we rely on internal competition)
- The technology might face regulatory and social resistance hindering the effectiveness of the implementation
- Community members must possess access to Smartphones and Signal in all parts of the Area

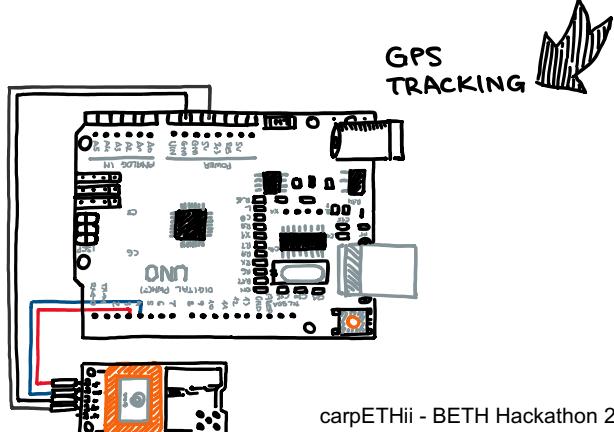
Avenues for Future Work

- Interfacing the Website with the Blockchain
- Application for the community members
- Create Community interface to allow for effective assignment and creation of tasks
- Creation and implementation of additional sensor indicators (Soil samples, air quality, etc.)

Sensor and IoT Implementation



SOIL-WATER QUALITY TRACKING



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Thank you for your attention.

