Project Title: Organic food tracking by using Blockchain in Lao PDR

Background :

Organic food production is one of the largest industries. Moreover, the Organic food supply chain also becomes more global over time . ICT for food have mitigated some of these challenges there is still a lot of problem. Integration costs remain high, there is still a lot of undetected fraud, pesticide, and transparency levels are insufficient to comply with the current and future demands of consumers and other vendors. A new area of technology, the Blockchain, can potentially solve many of the remaining problems for food transparency and control. This research focus on Organic food tracking by using Blockchain.

Targets:

1. Identify the current state of organic food traceability and control, and technologies and projects that can be valuable in designing Blockchain solutions.
2. Identify blockchain technologies and projects that can be applied within food traceability and control.
3. Develop the platform for organic food tracking by using Blockchain.
4. Protecting consumer health by using proposed platform.

5. Write a report and communicate the results to public authorities, the retail and food industry in order to stimulate interest and knowledge of the potential with the Blockchain technology.

Speaker: Dr. Phonepadith PHOUMMAVONG

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Project Members :

1.Department of Computer Engineering and IT, Faculty of Engineering National University of Laos (Laos): Dr. Somphone KANTHAVAONG, Dr. Phonepadith PHOUMMAVONG, Dr. Somsanouk PATHOUMVANH, Dr. Vimontha KHIEOVONGPHACHANH, Mr. Tha BOUNTHANH, Mr. Senglathsamy CHANTHAMENAVONG, Dr. Khampheth Bounnady, Dr. Khamphao SISAAT

2.King Mongkut's Institute of Technology Ladkrabang (Thailand): Dr. Boonprasert Surakratanasakul

2.Chulalongkorn University (Thailand): Dr. Gridsuda Phanomcho, Dr. Ratchatin Chancharoen, Dr. Widhyakorn Asdornwised, Dr. Lunchakorn Wuttisitikulkij, Dr. Charnchai Pluempitiwiriyawej

2.School of computing and informatics, Universiti Teknologi Brunei, Brunei Daussalam (Brunei): Dr. Ravi Kumar Patchmuthu

Project Duration :

05/2023 – 05/2025 (2 Years)

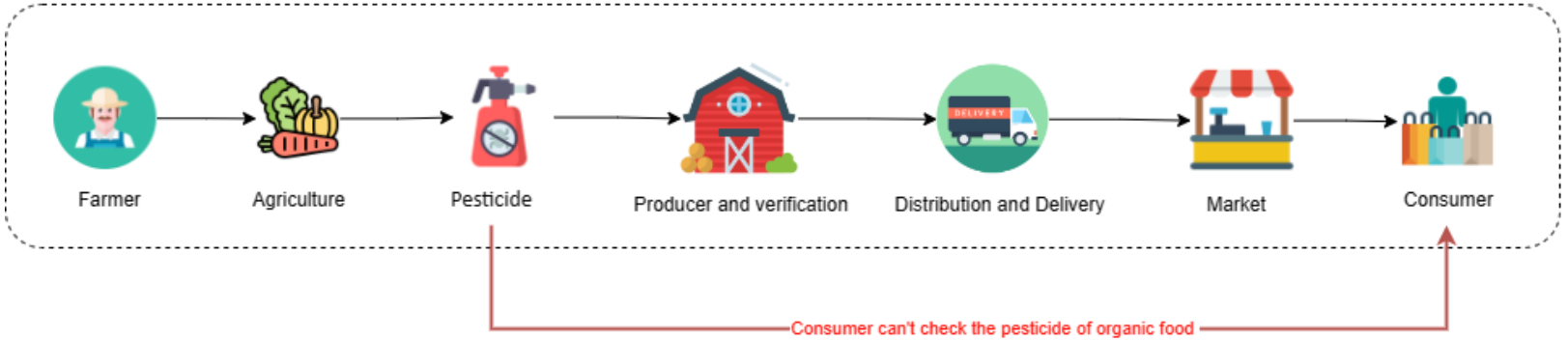
Project Budget:

$71,975.00

Project Activities: Scientific and technological

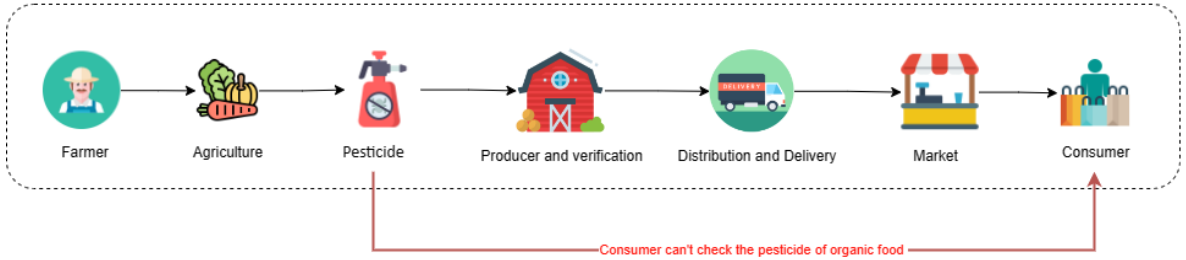
• Globalization of the articulate sector has dramatically increased the cross-border movement of organic goods, and hence increased the complexity of global supply chains. Today, it is often difficult for organic companies in Laos to trace each and every step in the journey of a specific product back to its origin of production (see Figure below).

• The organic food supply chain needs to be digitized in order to support full traceability. Today, weak technical systems aggravate rapid response times and efficient flows of information. Luckily, digitalization and technology innovations such as Blockchain are opening for efficient and low-cost solutions, overcoming these challenges.



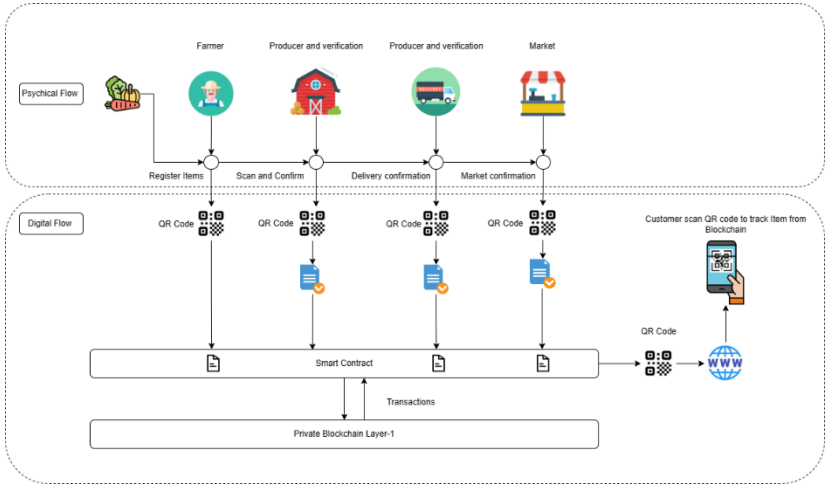
Project Activities: Solution

Current Problem

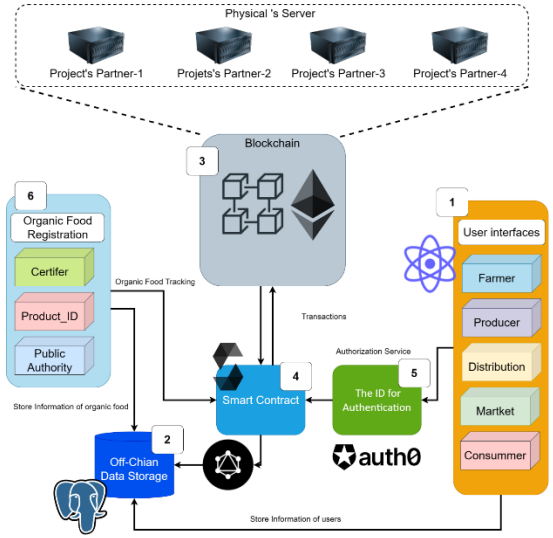


To be

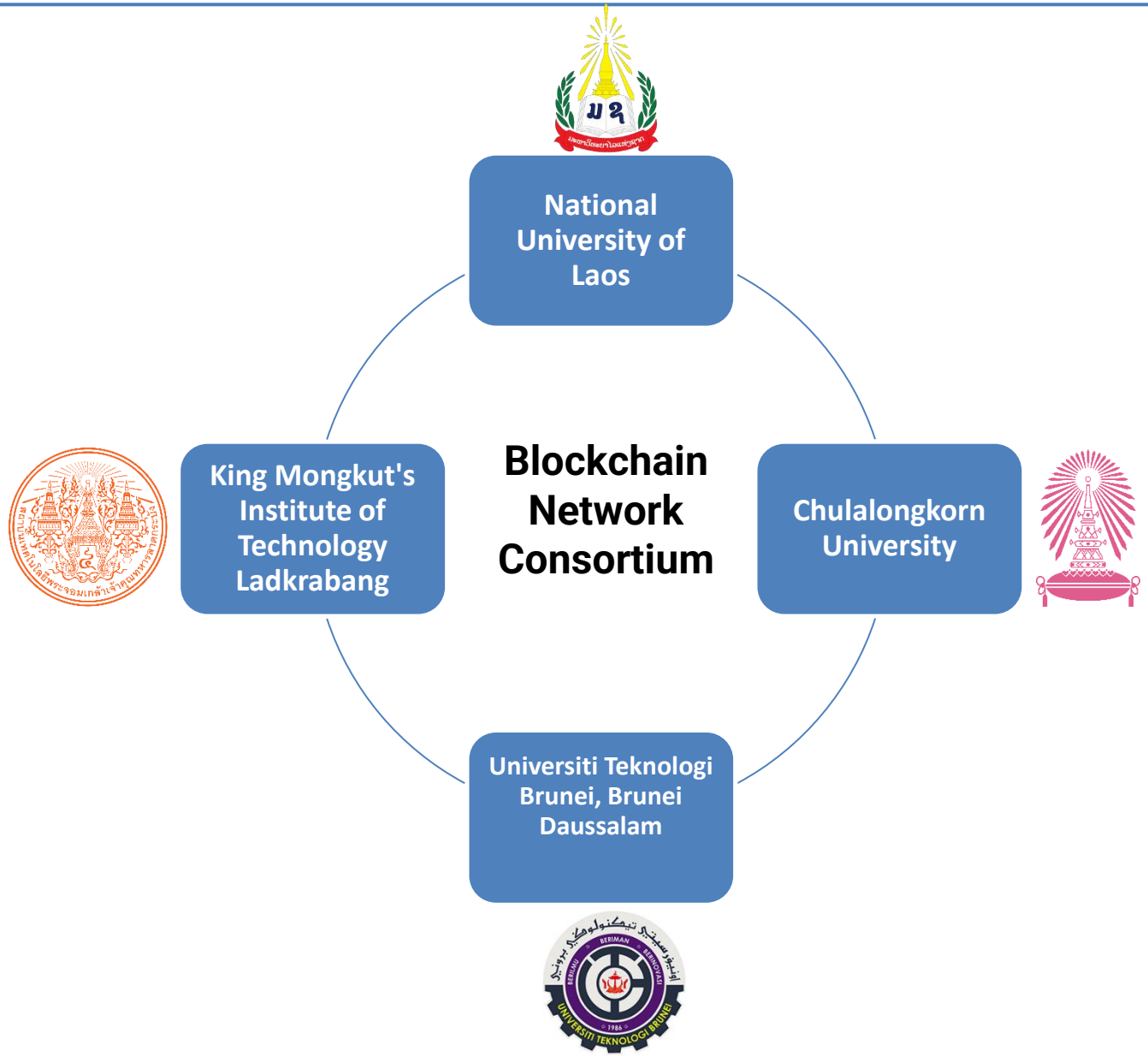
Logical



Physical



Project Activities: Implementation Concept



Project Activities: Application (or system) development

Blockchain technology can be used to create a transparent and secure supply chain for organic food that involves key players: farmers, producers, logistics companies, markets, and end-users.

- Farmers can use Blockchain to record information about their organic farming practices, such as the types of seeds used, the amount of water and fertilizer used and any pesticides or herbicides applied. This information can be verified by third-party auditors and stored on the Blockchain, providing transparent and immutable proof of the organic nature of the produce.

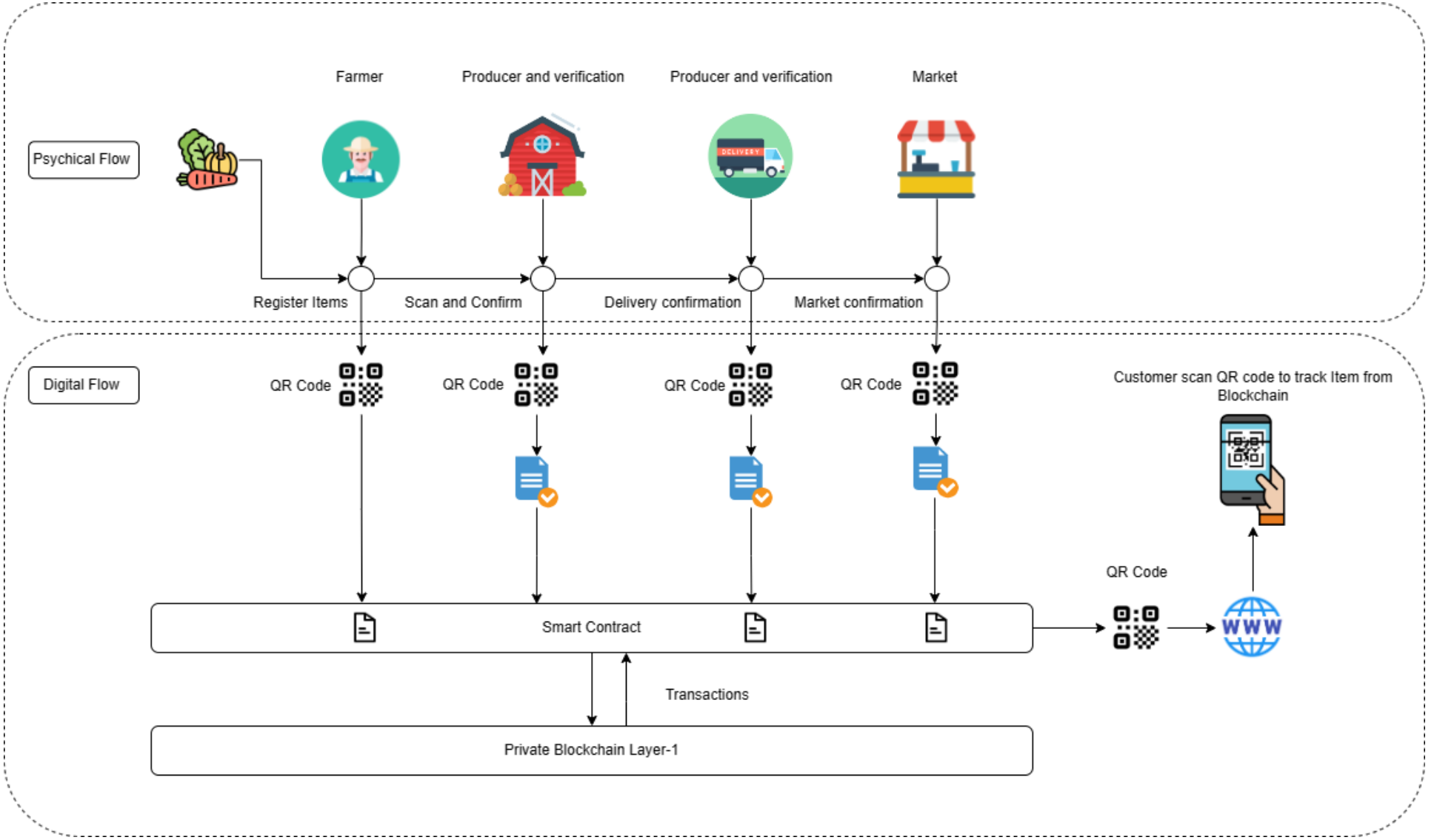
- Producers can then use Blockchain to track the movement of the organic produce from the farm to the production facility. This includes information such as the date and time of harvest, the location of the farm, and the transportation methods used. This information can help ensure that the produce is handled properly and that there are no gaps or delays in the supply chain.

- Logistics companies can use Blockchain to track the movement of the organic produce from the production facility to the market. This includes information such as the temperature and humidity of the transportation vehicles, the routes taken, and the time of delivery. This information can help ensure that the produce is transported properly and that it arrives at the market in a timely manner.

- Markets can use Blockchain to verify the authenticity and quality of the organic produce. This includes information such as the date and time of delivery, the location of the farm, and the certifications and audits conducted throughout the supply chain. This information can help ensure that the produce is truly organic and that it meets the high standards of the market.

- End-users can use Blockchain to trace the origin of the organic food that they are purchasing. can scan a QR code on the packaging of the product to access information about the farm, production facility, logistics, and market the produce came from. This information can help them make informed decisions about the food they are consuming and ensure that they are supporting sustainable and ethical farming practices.

Project Activities: Application (or system) development

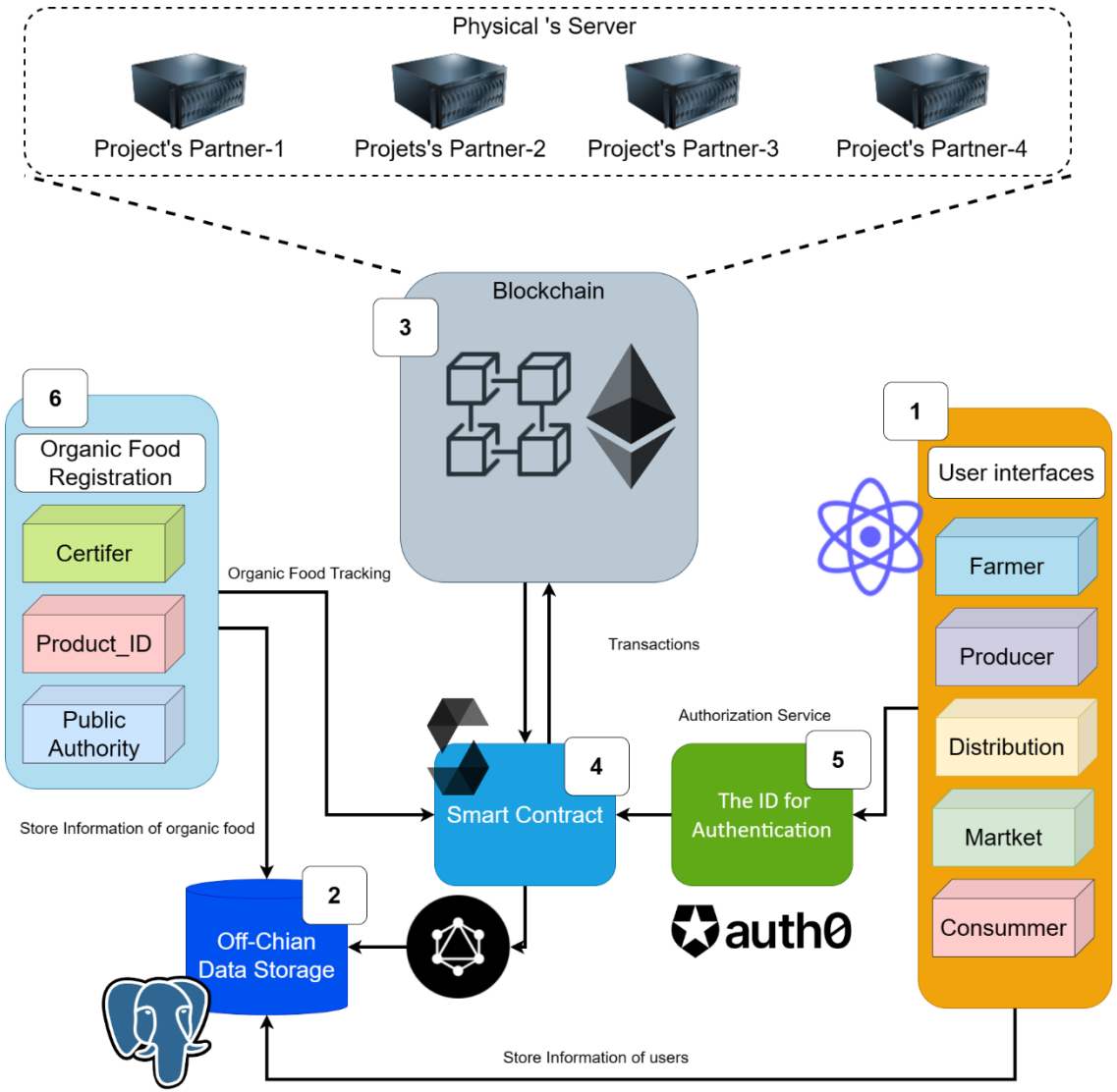


Project Activities: Experiments

Technical overview:

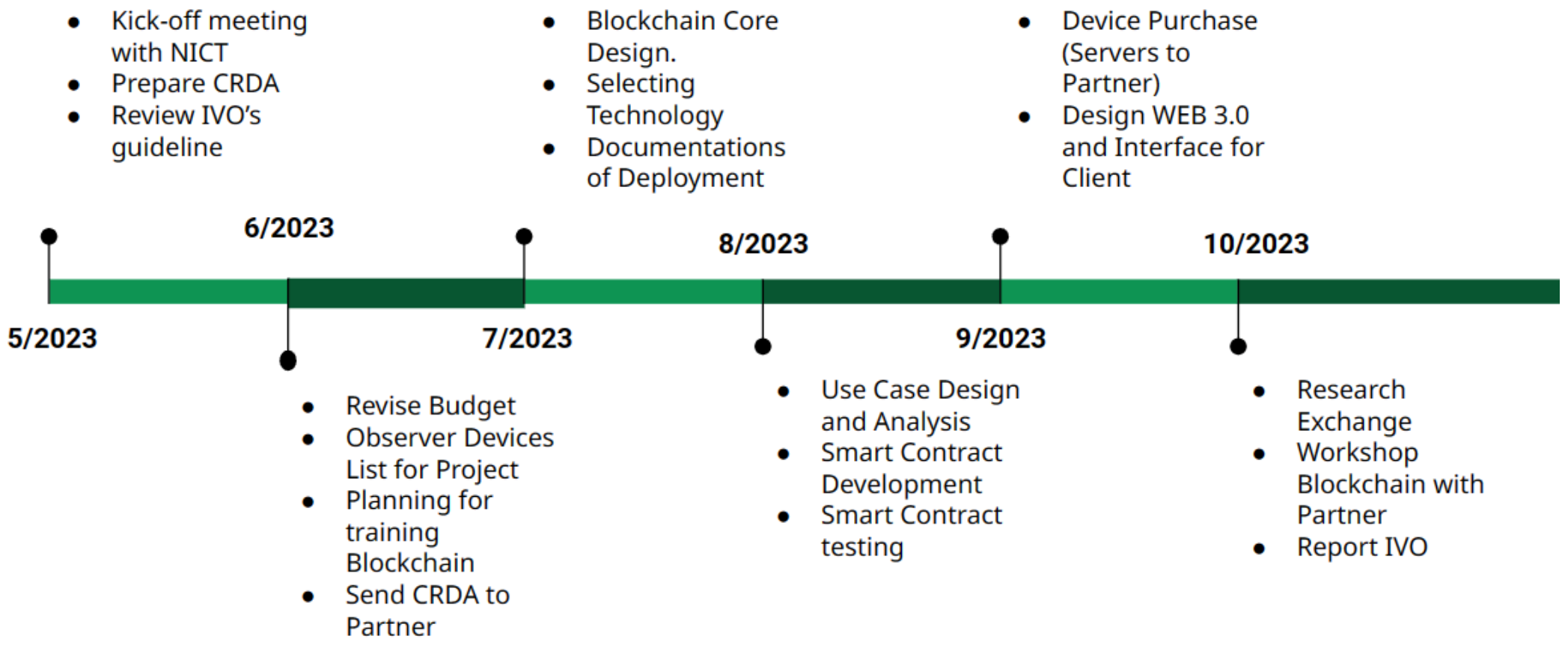
This implementation has six main parts of the Blockchain solutions in figure that will be used, at least in the case of private Blockchain.

1. User Interface (Web Application).
2. Off-Chain Database.
3. Blockchain Infrastruture
4. Smart Contract
5. Authentication
6. Operation Interface (web Application)



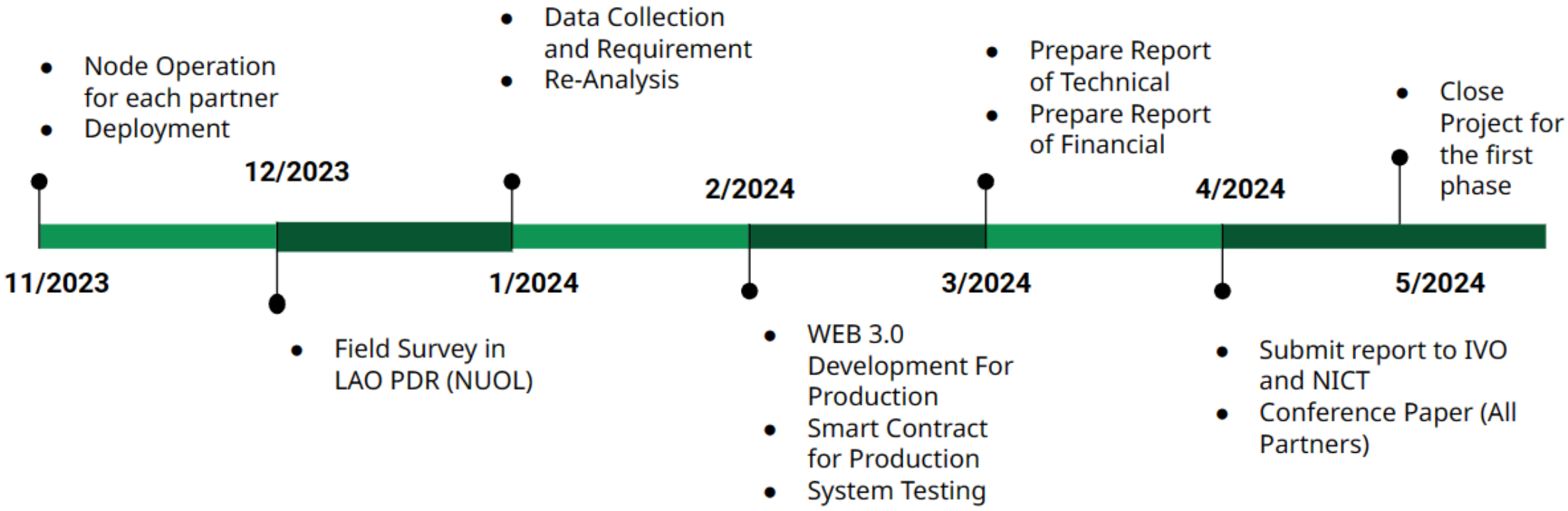
Project Activities: Timeline of This Research

Phase 1: 5/2023-5/2024



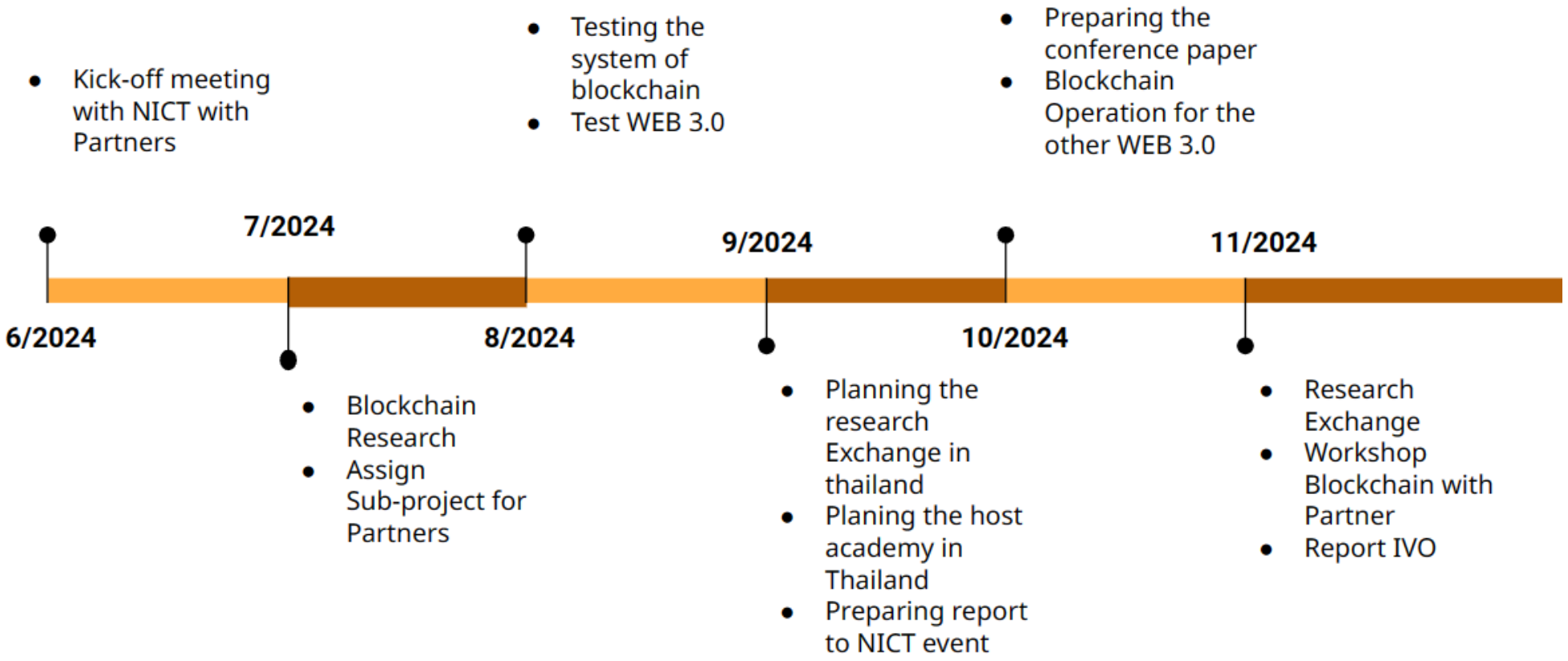
Project Activities: Timeline of This Research

Phase 1: 5/2023-5/2024



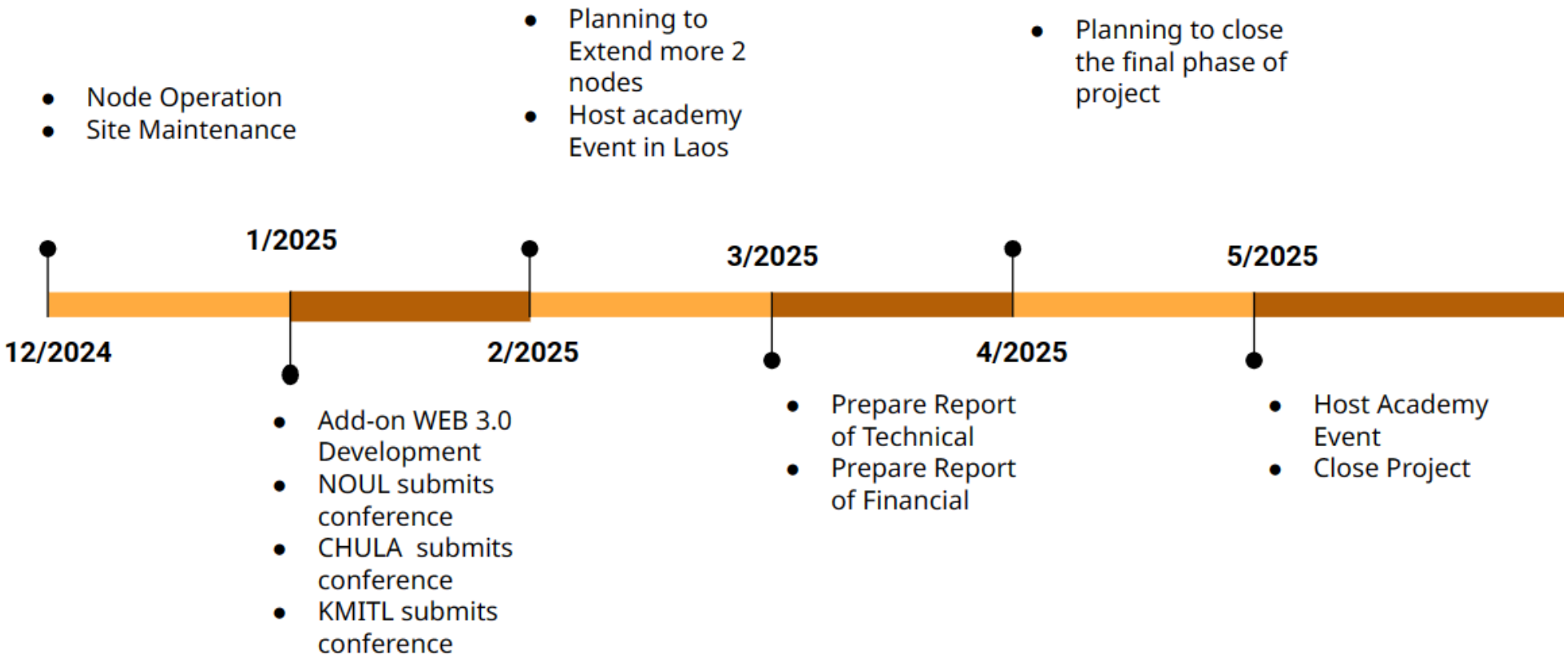
Project Activities: Timeline of This Research

Phase 2: 5/2024-5/2025



Project Activities: Timeline of This Research

Phase 2: 5/2024-5/2025



Societal Impact:

- The Communication is very important because partners are the key driver in developing flexibility and capabilities in the organic food supply chain.

- Partners must persuade their consumers to share useful information about operation and organic food. Moreover Partners can develop the monitoring platforms to facilitate blockchain's information sharing and node's operation also with their suppliers and consumers. Overall, partners must collaborate with extensive business partners who have knowledge sources of Blockchain to provide value-added service, Data and Dapp to customers in the innovative ecosystem.
- The broader impact of Blockchain technology on the organic food supply chain could be significant, as it has the potential to improve the transparency, traceability, and efficiency of the supply chain.
- Blockchain will also make it easier for companies to collect data on consumers so they can provide them with more personalized service than ever before (e.g., online shopping). Finally, we've already seen how smart contracts can help facilitate all types of business processes such as payments or asset transfers between parties without any need for middlemen such as banks or clearing houses.

Conclusion:

In conclusion, Blockchain technology can revolutionize the way organic food supply chains operate by a transparent and secure platform for recording and verifying information about the production, transportation, and distribution of organic food.

By using blockchain, farmers, producers, logistics companies, markets, and end-users can all benefit from increased transparency, efficiency, and trust in the organic food supply chain. The ability to trace the origin of organic food can also increase consumer confidence and support sustainable and ethical farming practices. Therefore, the adoption of blockchain technology in the organic food supply chain can lead to a more sustainable, ethical, and trustworthy food system.