

# Service Market

#P2PC

The proposed project will create a *fair-ground* for service producers and consumers who employ intermediaries to engage with each other. In between producers and consumers, intermediaries hold a powerful position that can decide the monetary values of the services. Understanding the value of the intermediary-existence, it is proposed to mitigate this drawback using blockchain-based smart contracts where both producers and consumers hold control of transaction flow. The pricing mechanism will be transparent, yet privacy preserving. This would empower both producers and consumers and be the first step of the ultimate goal -- everything-as-a-service in the future.

## Problem Definition

Intermediary assists in managerial tasks, including access management, communication, and quality of service between producers and consumers in a service environment. It is advantageous for resource-constrained producers (e.g. IoTs) to minimize the cost and managerial overhead on them. Instead they can focus more on their core production. Further, intermediaries are capable of handling a large number of similar pairs seamlessly which lead to high scalability of the application. However, intermediaries are not always the preferred choice as they can conceal the views of both producer and consumer in terms of service and pricing. It incurs a higher price for consumers compared to the actual fee of the producer. Pros and cons indicate the value of intermediary and on the other hand, the great power, held by them.

## Goal

My primary goal is to create a service environment for producers and consumers who engage with each other regularly through intermediaries. In that, the monetary transactions are to be transparent, yet preserving the privacy of consumers. It allows consumers to maintain a low managerial and transactional overhead and engage with their consumers. Consumers can benefit from the proposed transparent pricing mechanism. The intermediary can fairly charge for the brokerage. Additionally, the solution will be secure, scalable, and efficient. Finally, I hope this will be an initial step towards everything-as-a-service.

## Implementation

I intend to employ micropayment methods and techniques for payment transactions. Micropayments suit well in this regard because of recurring services in the targeted environments. In continuous service providing, either of the involved parties has to keep trust in the counterparty to get compensated or receive the service. Whoever makes the first move (payment by the consumer or service by the producer) can lose if the opponent avoided getting back. Micropayments can assist in minimizing the loss by lowering the quantity at stake. However, micropayments come with inherent deficiencies[1] which would be addressed in the proposed solution.

I will implement a micropayment protocol based on Ethereum using a novel cost-effective smart contract. To facilitate the engagement, I plan to build a rendezvous interface where producers can connect with intermediaries and publish their services for the consumers. Afterwards, they can make monetary transactions along with their services with minimum interaction with the blockchain.

## Deliverables

- Payment protocol -- This is an Ethereum smart contract based micropayment protocol where producers can remotely control the intermediate-consumer payment flow with low overhead. It is by design, embeddable to existing protocols[2].
- Rendezvous interface -- This is a marketplace where the service details including intermediaries and payment specifications are publicly available. Consumers can seamlessly engage with multiple providers with multiple intermediaries.
- Facilitating API -- APIs will facilitate communication between three parties, yet they do not have to depend on the system.

## Timeline

7th June - 13th June	Project initialization, knowledge acquisition and familiarizing the required tools.
14th June - 20th June	Design of the payment protocol.
21st June - 27th June	Design of the smart contract.
28th June - 4th July	Design of the rendezvous interface.
5th July - 11th July	Smart contract implementation on an Ethereum private network.
12th July - 18th July	Testing and security evaluation of smart contracts.
19th July - 25th July	Interface implementation.
26th July - 27th July	Interface integration to the blockchain.
2nd August - 8th August	Design and implementation of APIs.
9th August - 15th August	Deployment, testing and finalize the project.
16th August - 22th August	Finalize the documentation.

## SCoRe Contributions

I have contributed to SCoRe lab projects during my undergraduate.

## Personal Information

I am a PhD student at National University of Ireland, Galway. My involvement and expertise in payment protocols and blockchain domain drove me to propose this solution.

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## References

[1] Ali, S. T., Clarke, D., & McCorry, P. (2017). The nuts and bolts of micropayments: A survey. ArXiv.

[2] Al-Sarawi, Shadi, et al. "Internet of Things (IoT) communication protocols." 2017 8th International conference on information technology (ICIT). IEEE, 2017.