



# • Blockchain Applications for Agile Methodologies

---

Valentina Lenarduzzi, Maria Ilaria Lunesu et.al



# Abstract

- This paper presents an application of Blockchain technology and Smart Contracts to the management of Agile projects, using Scrum and Lean-Kanban processes.
- Here, tasks of Product Owner are delegated to one or more Smart Contracts deployed on the Ethereum blockchain.

# Introduction

- Agile methodologies are rooted in adaptive planning, early delivery and continuous improvement.
- Some process such as test verification or verification of acceptance criteria can be automated.
- This solution aims to automate some of these processes in Agile software development.
- Here, **Smart Contracts** are used to execute the acceptance tests and to verify the fulfillment of the conditions.
- Using blockchain, transparency increases and makes it publicly acceptable.

# Background

- Agile methodologies, such as Scrum, are based on an incremental development model and follow three principles:
  - Any activity must be visible to all the responsible team,
  - Concurrent artifacts inspection
  - Rapid process adaptation
- The development phase is structured in Sprints wherein the requirements discussed by the **Product Owner** (PO) in the form of User stories are developed and presented by the developers.
- The problem of the user stories elicitation is the communication between PO and developers team.

# Model Implementation

- The paper proposes to certify the correctness of the process outcome delegating them to one or more Smart Contracts.
- Once the Smart Contracts are deployed, the code cannot be changed.
- The time stamps registered on the Blockchain blocks for each transaction can trace all operations performed by Smart Contracts.

# Model Implementation

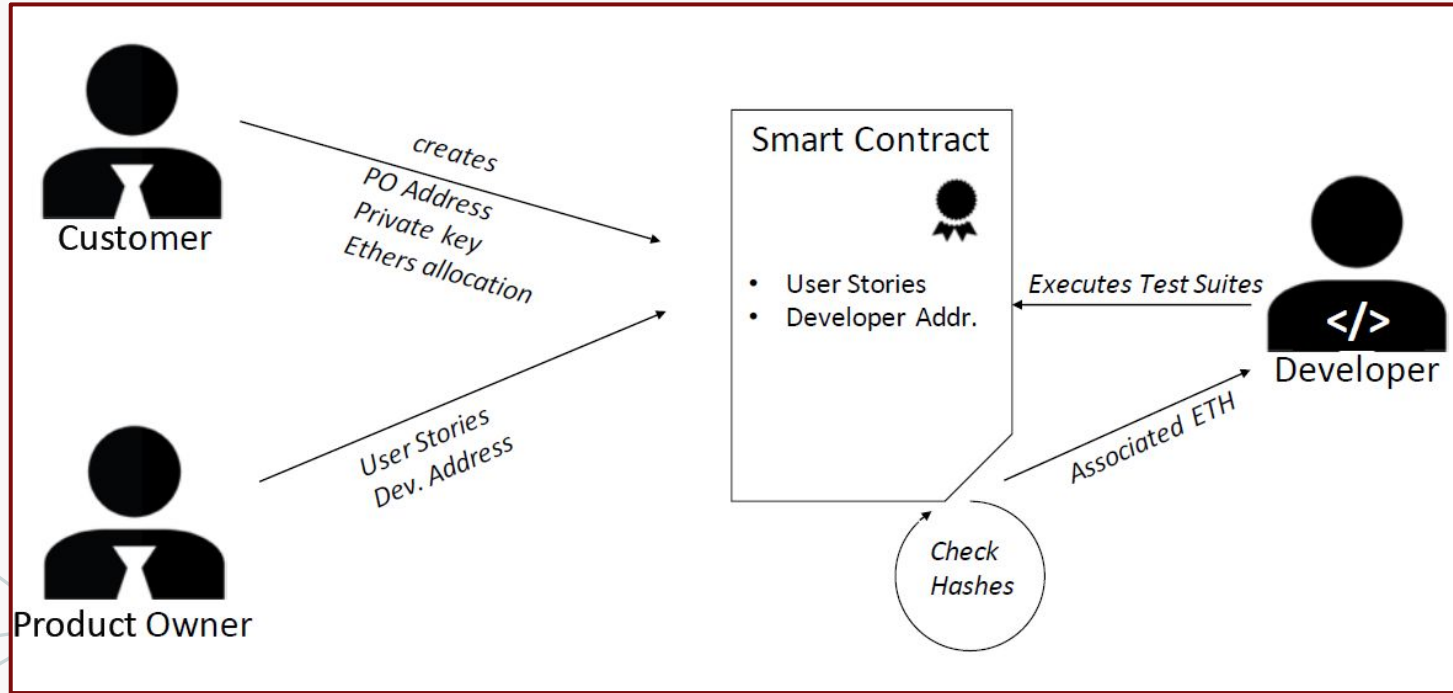
The project development is divided in User Stories (US). The implementation flow can be in Sprints or continuous.

When a US is correctly implemented, the test should pass, generating a Json file identical to the correct one with same hash digest

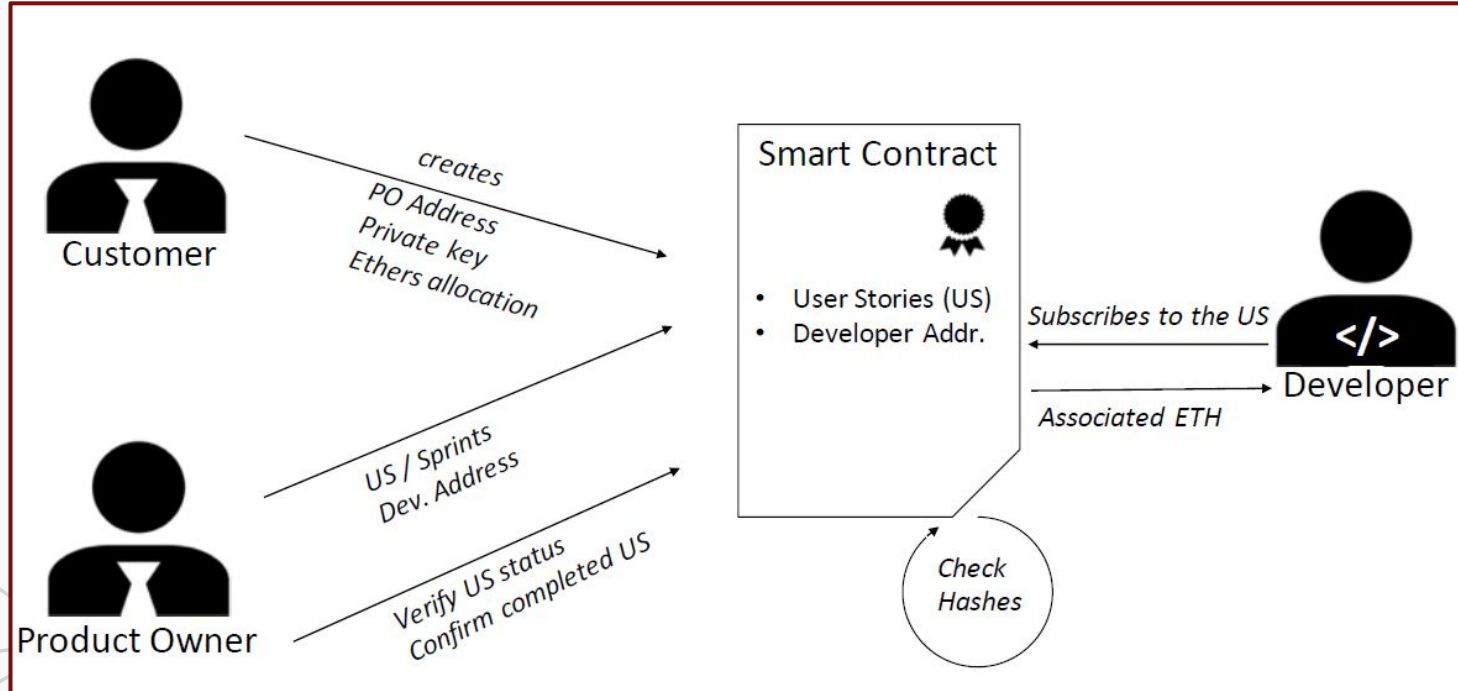
Each US is provided with one or more Acceptance Tests (AT), whose correct result is coded in a Json file, whose hash digest is registered in the blockchain by the PO.

PO triggers the run of Smart Contract code on the blockchain to certify US validation comparing the two hash digests and eventually enabling payment in a crypto value

# The Model Implementation - Continuous flow



# The Model Implementation - Scrum Process





# Conclusion

- The proposed work opposes the Agile mindset open to the continuous changes.
- But the native nature of the blockchain as a trustless technology perfectly suites the spirit of mutual trust of Agile Manifesto.
- The paper propose to use blockchain and smart contracts for the automatic verification that test passed without the direct involvement of the PO with the unique purpose of relieving some of his duties.
- Future challenges involves to take advantage of the Blockchain strengths to complement the possible weaknesses of Agile-Lean approaches.



# Thank You