Talk: Orçun Oruç

Role-based programming is a natural way to describe the identities and collaborations of objects in object-oriented smart contract applications. Hence, we can use an object-oriented general-purpose language to model roles with objects. However, the role-based modeling approach naturally suffers from collective intelligence, trust enablers (participants should be trusted by an external authority in a decentralized manner), and auditable actions. Collective intelligence can be provided by agent concepts because agents can understand the world for roles with an internal plan library. Moreover, the environment can be defined by an agent's mental status and each agent can plan activities and test the result of the activity whether or not it has been accomplished. To provide trustable and auditable actions by agents, smart contracts should be integrated intrusively or non-intrusively. A smart contract can check the preconditions and postconditions in a single agent lifecycle and provide auditable actions in a collective plan library. For instance, a group of agents that have identified themselves with different roles, that reside in compartments, can achieve a common goal according to a dynamic environment. When you define dynamic parameters with roles, a group of agents can simulate a particular use case with goals and subgoals that are relevant to a plan.

The main purpose of this study is to generate an embedded domain-specific language that can generate agent architecture in role-based smart contracts. To generate agent architecture, the study has been conducted for external agents Belief-Desire-Intention (Plan Library Pattern) frameworks such as JADE, Jadex, JASON with AgentSpeak, and LightJason and agent-oriented blockchain architecture with on-chain smart contract language. As for the main contribution, we are designing an on-chain agent-oriented framework with roles-compartments, which is going to be a deterministic architecture that works in a blockchain network. At the end of this study, we would like to evaluate using quantitative and qualitative parameters.