

THE DECENTRALIZED AGENT ORIENTED MODELLING FRAMEWORK FOR BUILDING DAPPS

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SMART-CONTRACT APPLICATIONS IN THE ORGANIZATIONS

Main reasons for adoption of blockchain enabled smart-contracts in organizations:

- → Transparency
- → Trust
- → Data Security and Privacy
- → Resource Management
- → Tamper proof
- → Information system Interoperability

GAPS

- Absence of proper software engineering approach for building DApp.
- DAOM provides a model-driven approach for design and development of Dapps.

Item	Source (RL/ID)	Category (F/M/T)	Application Domain	Design support	Development support	Blockchain limitation addressed				
						Usability	Security flaws	Cost Scalability		Other benefits
Ancile	RL	M	healthcare	+	+	-	-	-	+	-
Ontology driven modelling	RL	M	Supply chain	+	+	-	-	-	-	data interoperability
Process reduction	RL	M	Supply chain	+	+	-	_	++	-	code generation
Software Engineering for Dapp	RL	F	A11	++	+	++	_	-	-	stakeholders communication
Agile + scrum kanban	ID	M	A11	-	++	-	-	-	-	task management
Standard UML diagrams	ID	Т	A11	+	+	-	_	-	-	technical communication
Standard BPMN diagrams	ID	Т	A11	+	-	+	-	-	-	stakeholders communication
Free hand sketch activity diagram	ID	Т	A11	+	-	+	-	-	-	flexibility

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DAOM MAIN DIAGRAM TYPES

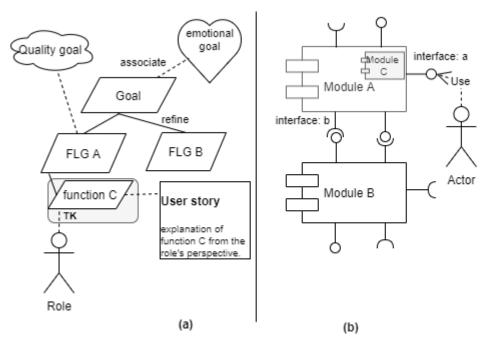
A) Requirement Diagram: goal, quality goal, emotional goal, onchain functions and user-stories.

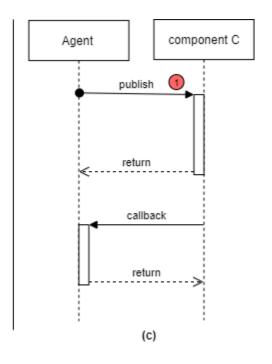
B) Static Architecture:

Components, subcomponents, tokenizedcomponents, interfaces and actors.

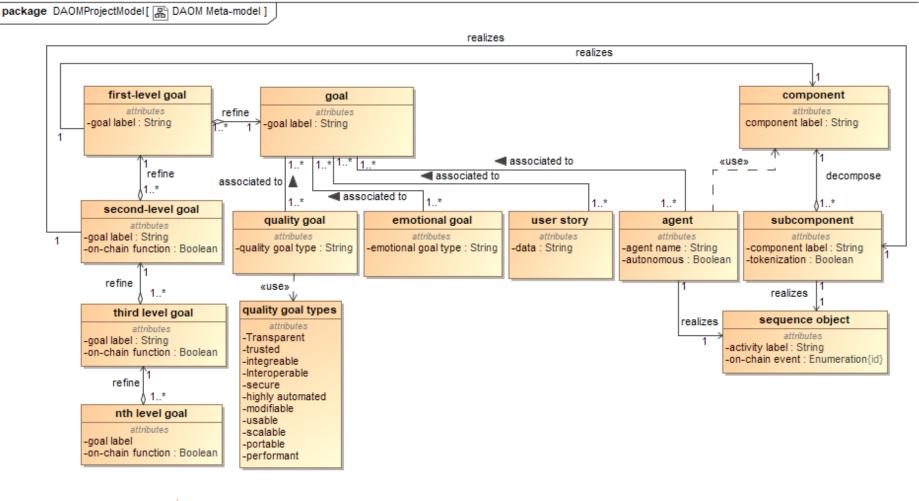
C) Behaviour diagram:

Sequence object, sequence activity and on-chain event.





DAOM DIAGRAM ELEMENTS



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DAOM MFTA-MODEL

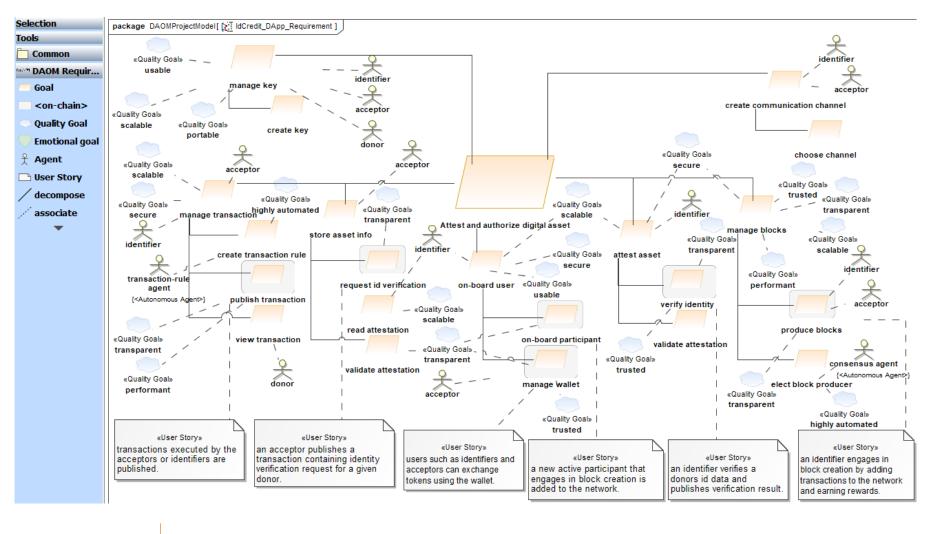
- -> DAOM elements
- -> DAOM elements relationships
- The main goal is value propostion of the Dapp.
- The goals are refined into subgoals
- Goals are functions (or state) that is to be achieved.
- On-chain label is attached to goals that result in state change of the blockchain.
- Quality goal defines how a goal is achieved.
- Agents are users and software agents that executes a goal.
- Using heuristic mappings, Secondlevel goals realizes the main components of a DApp.
- Tokenized components are interfaces that capture the exchange of value between components.
- The sequence object shows the usecase of the Dapp that results in state change of the blockchain.
- Onchain transactions are activities that results in state change.

APPLICATION OF DAOM IN DESIGN OF A SAMPLE DAPP

The IdCredit blockchain Dapp:

- Re-usable KYC attestation on blockchain
- Verifications are performed once and result stored on-chain.
- Existing verification result stored on-chain can easily be accessed.
- Quicker access to e-services and without concern of failing verification

THE IDCREDIT REQUIREMENT MODEL



- Main functions in the Dapp:
- ->managing keys
- ->on-boarding users and assigning roles
- -> managing transactions and creating transactions
- ->managing block creation
- Stakeholders:
- -> Acceptors create attestation request transactions.
- -> Identifiers create verification transactions.
- -> Donor is the owner of the ID-data that is verified.
- -> Active users that participates in block creation.
- -> Consensus agent elects the next block producer.

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THE IDCREDIT STATIC ARCHITECTURE

- Main components and sub-components that make up a DApp.
- Interfaces showing data (information) exchanged between components.
- Stakeholders (and agents) showing access to specific components and actions performed.
- Some of the data exchanged: public key, donor identity data, token balance and attestation result.

Selection package DAOMProjectModel[割 ldCredit_DApp_Architecture] Tools «component» Common «component» communication key manager DAOM Architecture channel donor identity data Tokenized c... key creation key generator communication component protocol Actor public key Ell Component Di.. all stakeholders Class «component» onboard manager Component «Tokenized component» Port wallet manager onboarding gain token Package trans fer token Artifact Artifact I... «Agent» «component» attestation processing acceptor Interface attestation request component component Interface ... spend token «Tokenized component» «Tokenized component» identity verifier id verification «Agent» Usage manager request manager verification data view Generalization acceptor attes tation digital asset manager attestation viewer Link «Agents identifier ... Manifestation «component» check id data validation manager validation manager validate 1 Information Fl.. «Agent» trans action V publish acceptor «compohent» transaction, manager «Tokenized component» «component» trans action rule transaction publisher transaction manager rule manager all stakeholders validate transaction generate transaction rule agent transaction rule trans actions transaction rule attestation data «component» block manager acceptor elect block «Tokenized component» 🗄 «component» producer block generator manager «Agentx consensus agent identifier

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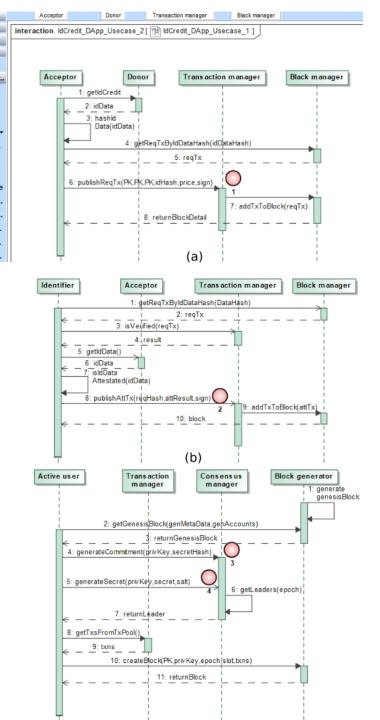
THE IDCREDIT USE-CASES

Transactions results in state change of the blockchain:

- Payment transactions: token exchange between participants.
- Verification request transaction
- Attestation transaction.
- Committment transaction
- Secret transaction

The last two transactions are for electing block producers and does not result in token gain or loss.

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On-chain

Lifeline

Loop

Alternatives

Interaction .

· Call Message

Reply Messa.

⇒□ Create Mess.

Message to ...

Message

NEXTS STEPS FOR DAOM

- More and more use-cases
- Automation of code generation for common functions in interorganizational collaborations.