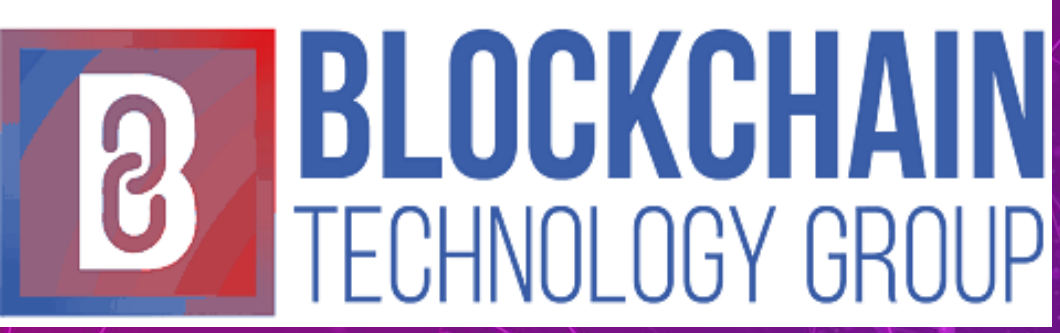

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THE DECENTRALIZED AGENT ORIENTED MODELLING FRAMEWORK FOR BUILDING DAPPS

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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	Privacy leakage	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	All	++	+	++	-	-	-	stakeholders communication
Agile + scrum|kanban	ID	M	All	-	++	-	-	-	-	task management
Standard UML diagrams	ID	T	All	+	+	-	-	-	-	technical communication
Standard BPMN diagrams	ID	T	All	+	-	+	-	-	-	stakeholders communication
Free hand sketch activity diagram	ID	T	All	+	-	+	-	-	-	flexibility

DAOM MAIN DIAGRAM TYPES

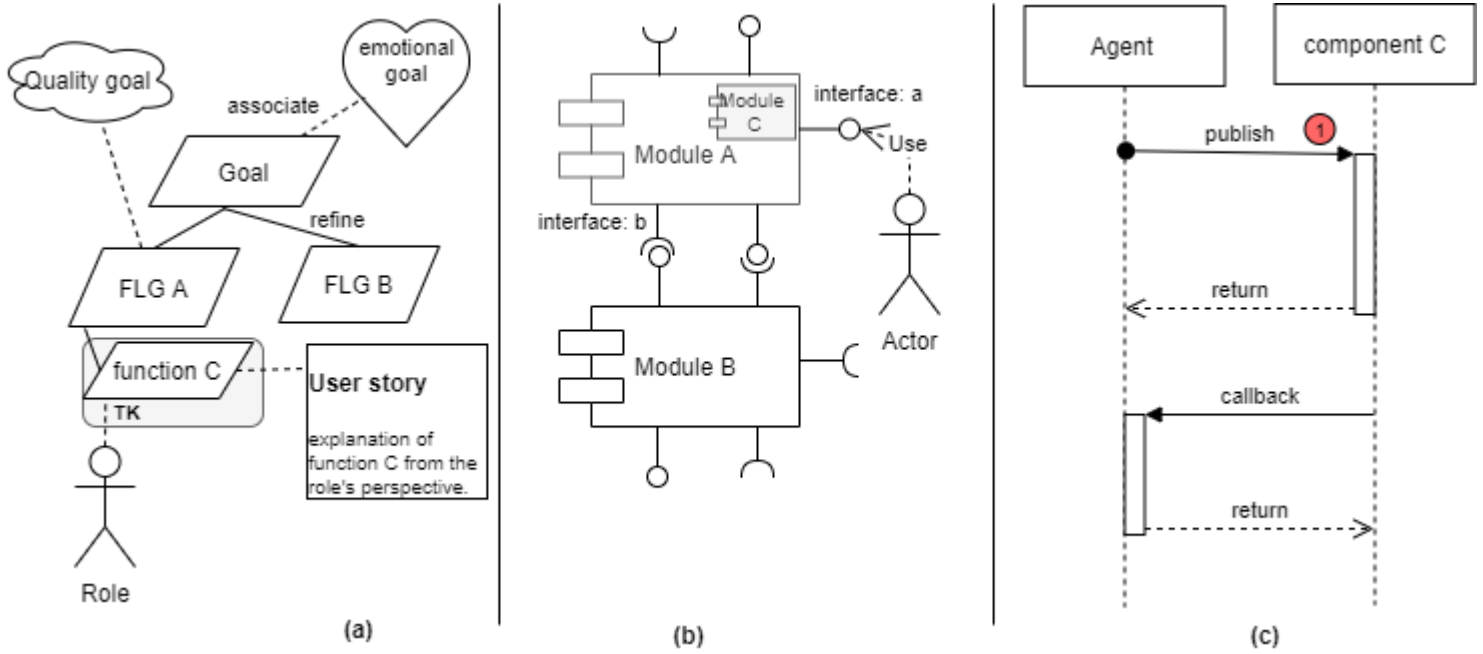
A) Requirement Diagram: goal, quality goal, emotional goal, onchain functions and user-stories.

B) Static Architecture:

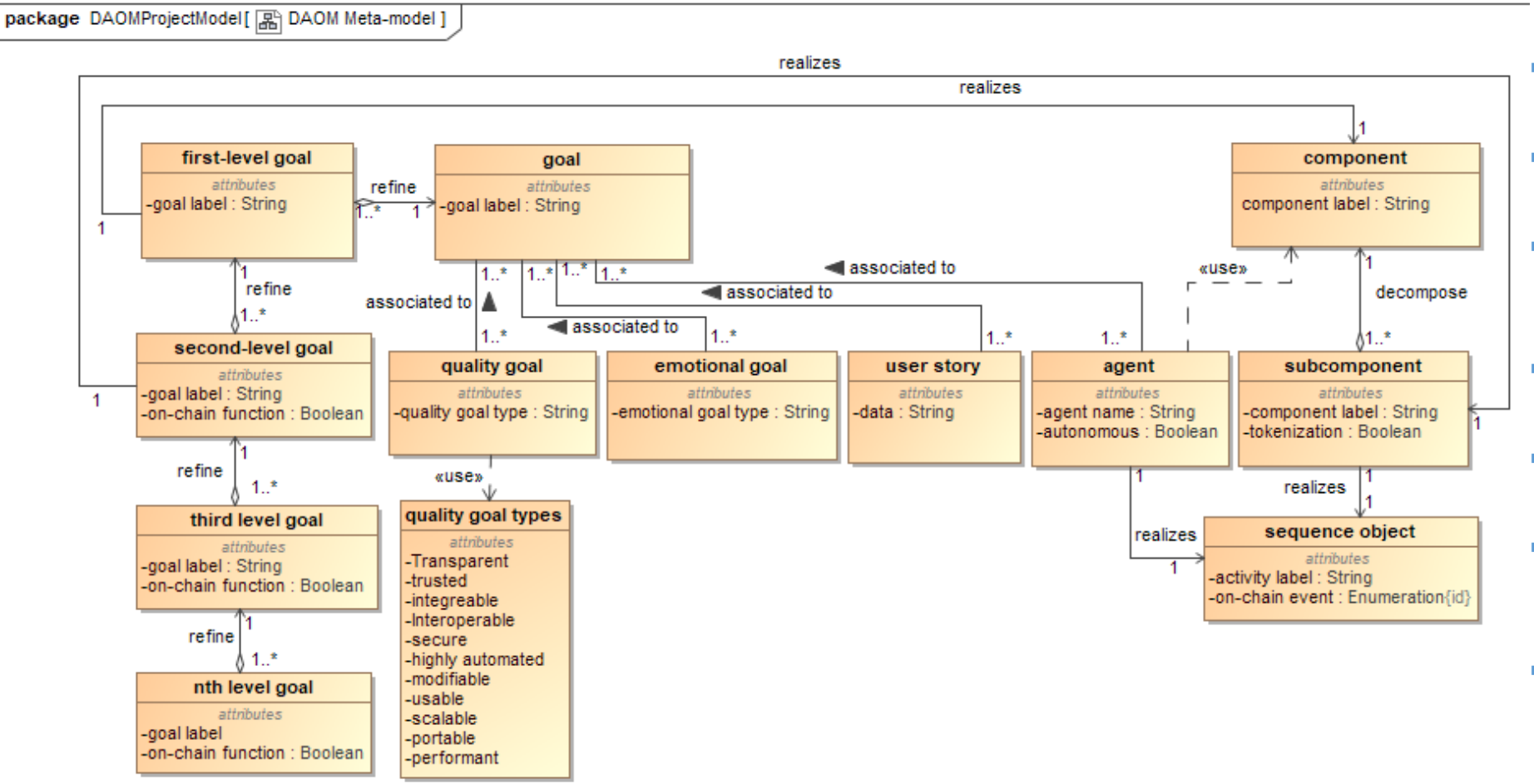
Components, sub-components, tokenized-components, interfaces and actors.

C) Behaviour diagram:

Sequence object, sequence activity and on-chain event.



DAOM DIAGRAM ELEMENTS



DAOM META-MODEL
-> DAOM elements
-> DAOM elements relationships

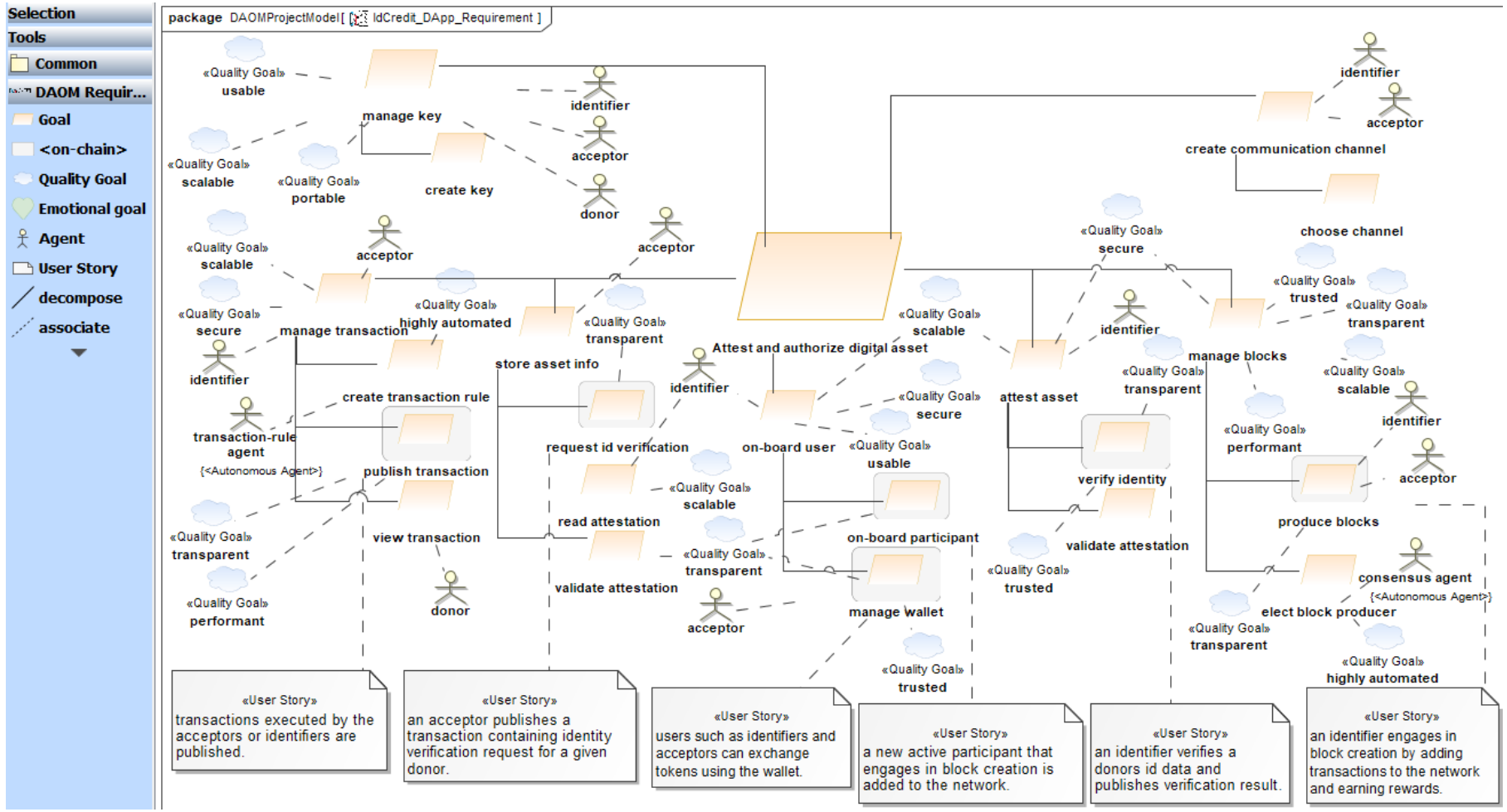
- The main goal is value propostion of the Dapp.
- The goals are refined into sub-goals
- Goals are functions (or state) that is to be achieved.
- On-chain label is attached to goals that result in state change of the blockchain.
- Quality goal defines how a goal is achieved.
- Agents are users and software agents that executes a goal.
- Using heuristic mappings, Second-level 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.

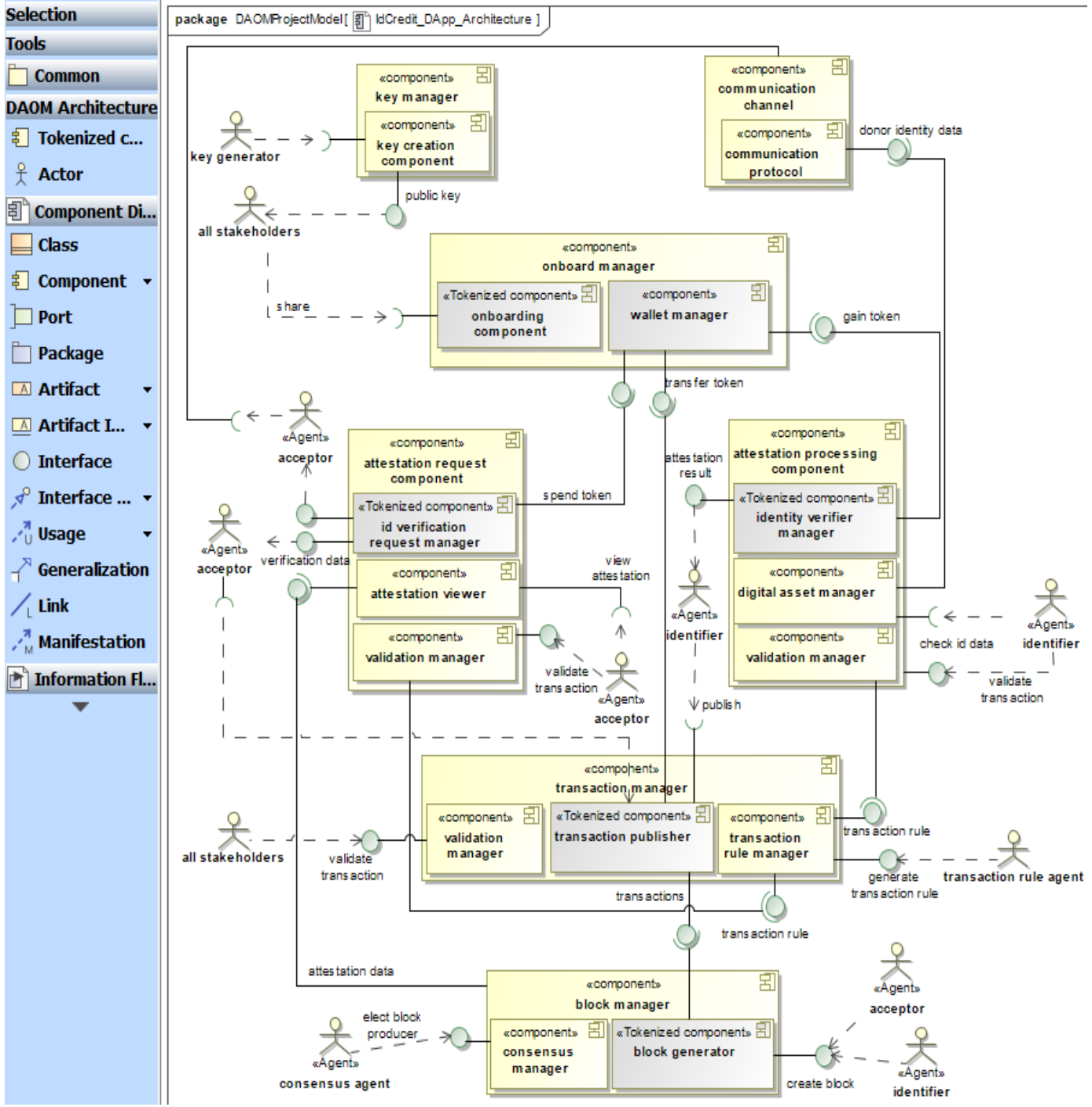
-> Donor is the owner of the ID-data that is verified.

-> Active users that participates in block creation.

-> Consensus agent elects the next block producer.

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.

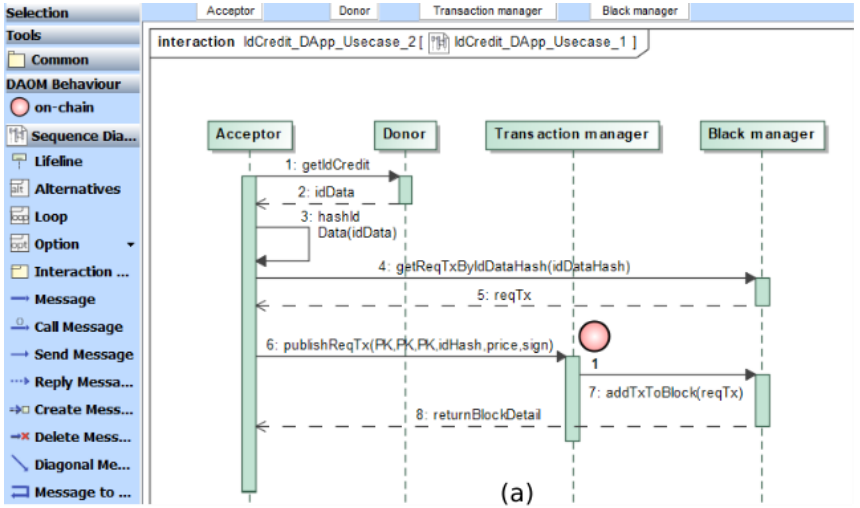


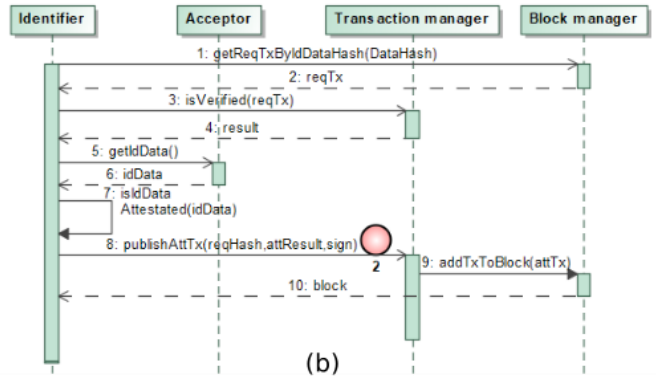
THE IDCREDIT USE-CASES

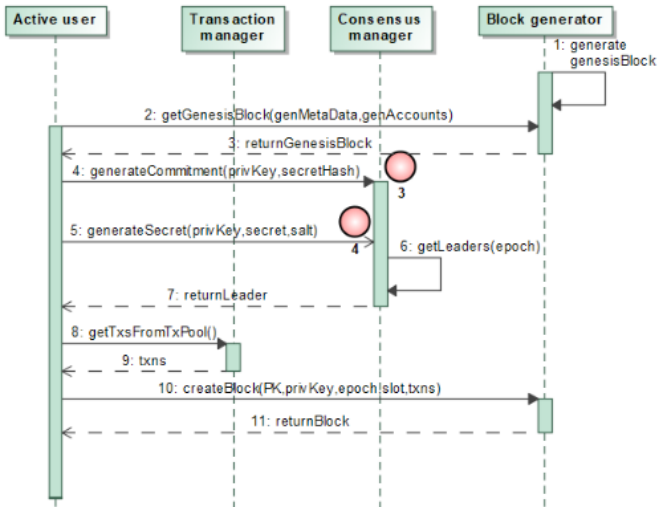
Transactions results in state change of the blockchain:

- 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.







NEXTS STEPS FOR DAOM

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