DEDIS Ledger Architecture

D-Voting

Access control and permission management on the DELA blockchain

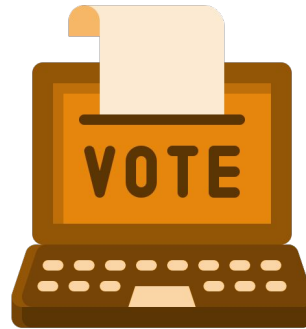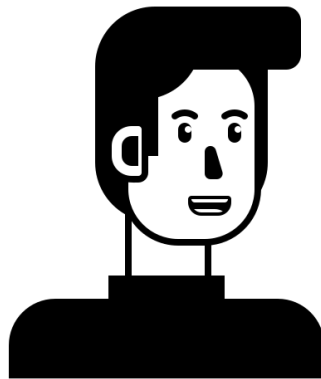## Final Presentation

Presenter:

Maxime Zammit

Prof. Bryan Ford (DEDIS)

Supervisors: Pierluca Borsò-Tan (DEDIS), Carine Dengler (C4DT)　　**DEDIS/C4DT**

Agenda

Maxime Zammit

D-Voting - Access control & permission management

Introduction to D-Voting
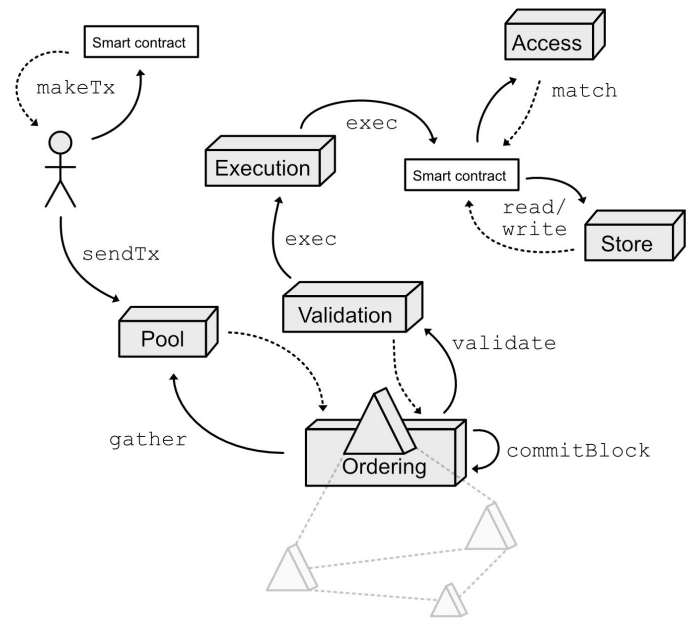
D-Voting - Access control & permission management

Semester Project Goal

Main Properties:

No Single Point Of Failure

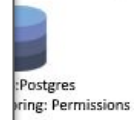Privacy

Transparency /Verifiability/ Auditability

D-Voting - Access control & permission management

Semester Project Goal

Design - Before

EPFL

D-Voting - Access control & permission management

FRONTEND

BACKEND

PERMISSION DB

SciperID

End-User

PROXY

TX_1 TX_2 TX_3 ... TX_N

BLOCKCHAIN
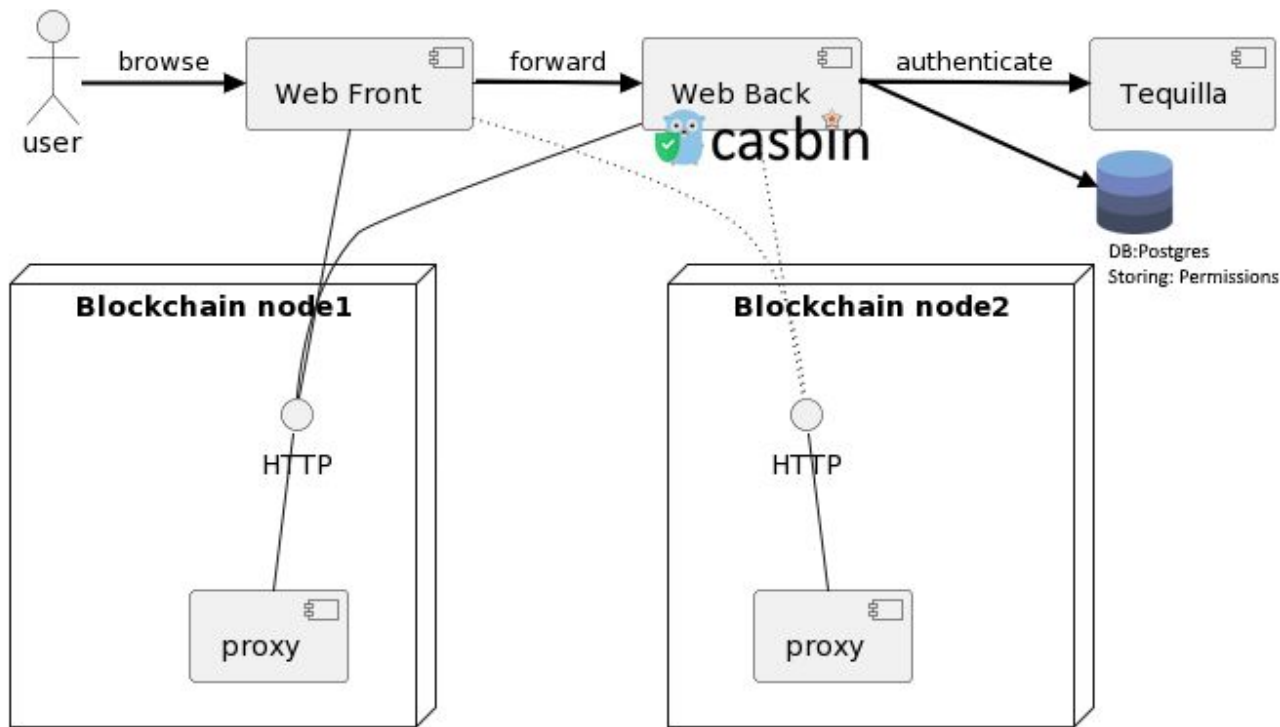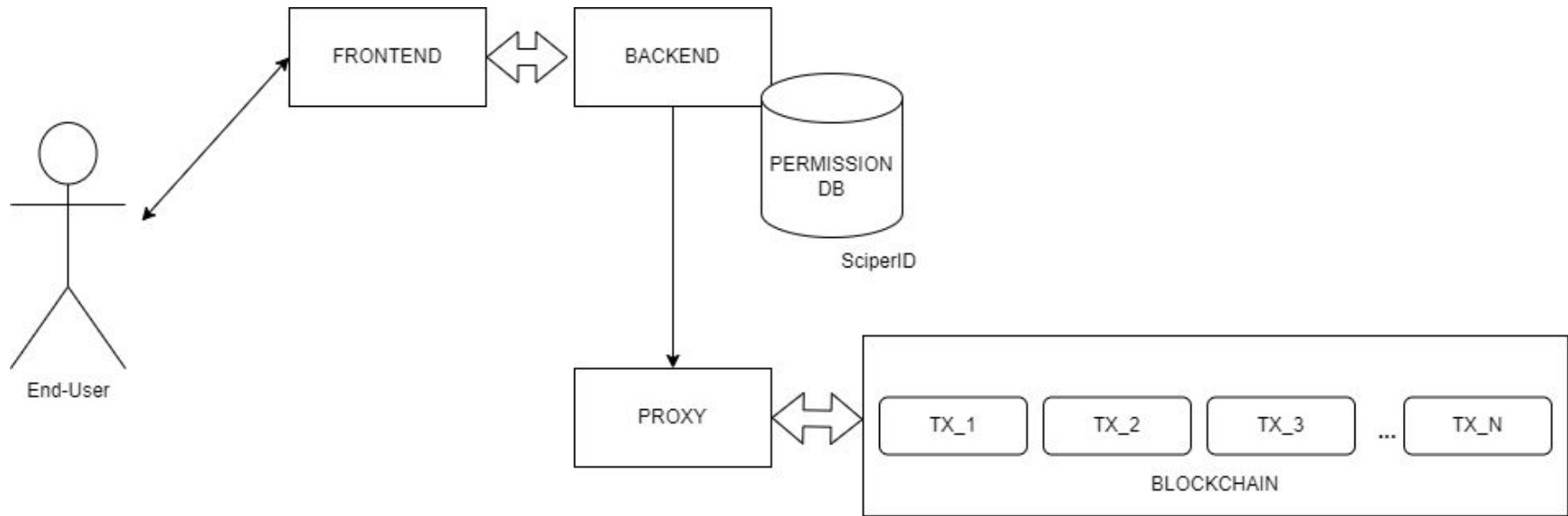
Design - Implemented

EPFL

D-Voting - Access control & permission management

FRONTEND

BACKEND

End-User

PROXY

In Theory:
But currently, as authentication is done by the backend, we still need to go through it to sign the request.

TX_1   TX_2   TX_3   ...   TX_N

BLOCKCHAIN
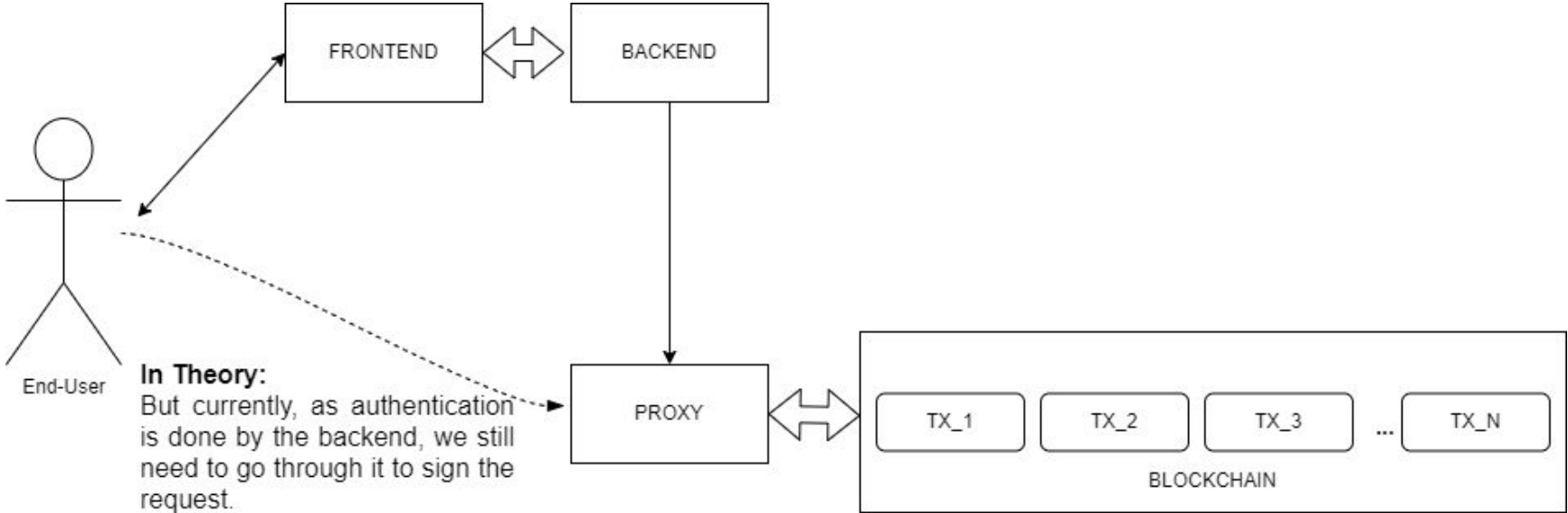
Design - Permission management

Admin: Create Form

→ Owner

USER

Admin   Visitor

Open
Close
Shuffle
Combine
Cancel
Delete
Add Voters

+Add/Remove Admin
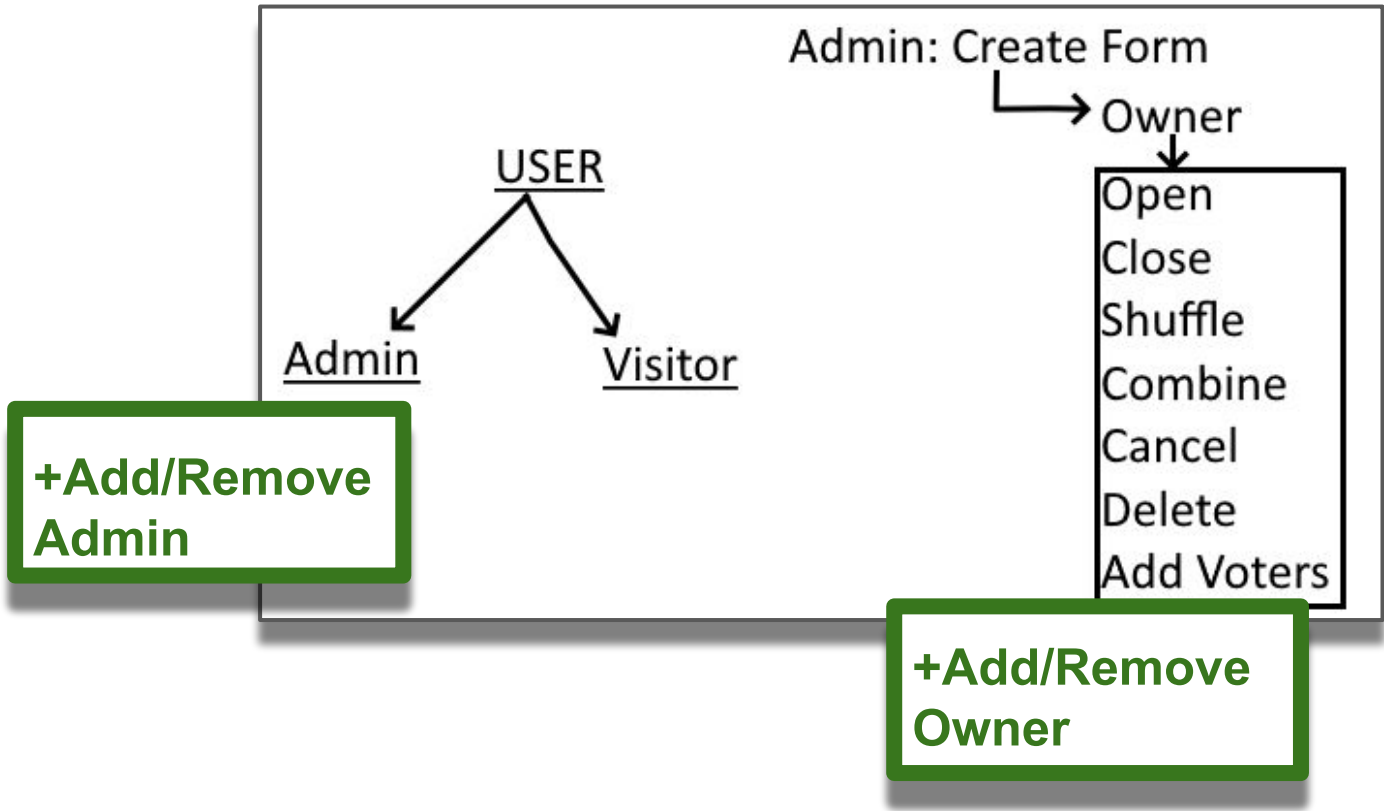
+Add/Remove Owner

Design - Architectural modification

Form:
- Title
- …
- Owners[]
- Voters[]

NEW

AdminList:
- SCIPER[]

NEW

Implementation - Admins & Owners/Voters

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D-Voting - Access control & permission management

```
Form:
-    Title
-    …
-    Owners[]
-    Voters[]
```

```
AdminList:
-    SCIPER[]
```
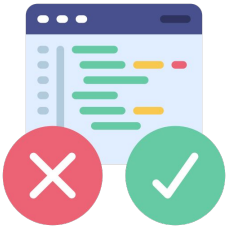
Operations (Admins/Owners/Voters):
-    Add
-    Remove

Idempotent: Can be executed multiple times without changing the result.
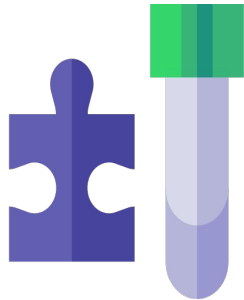
Admins: Trust on first use.

Implementation - Testing

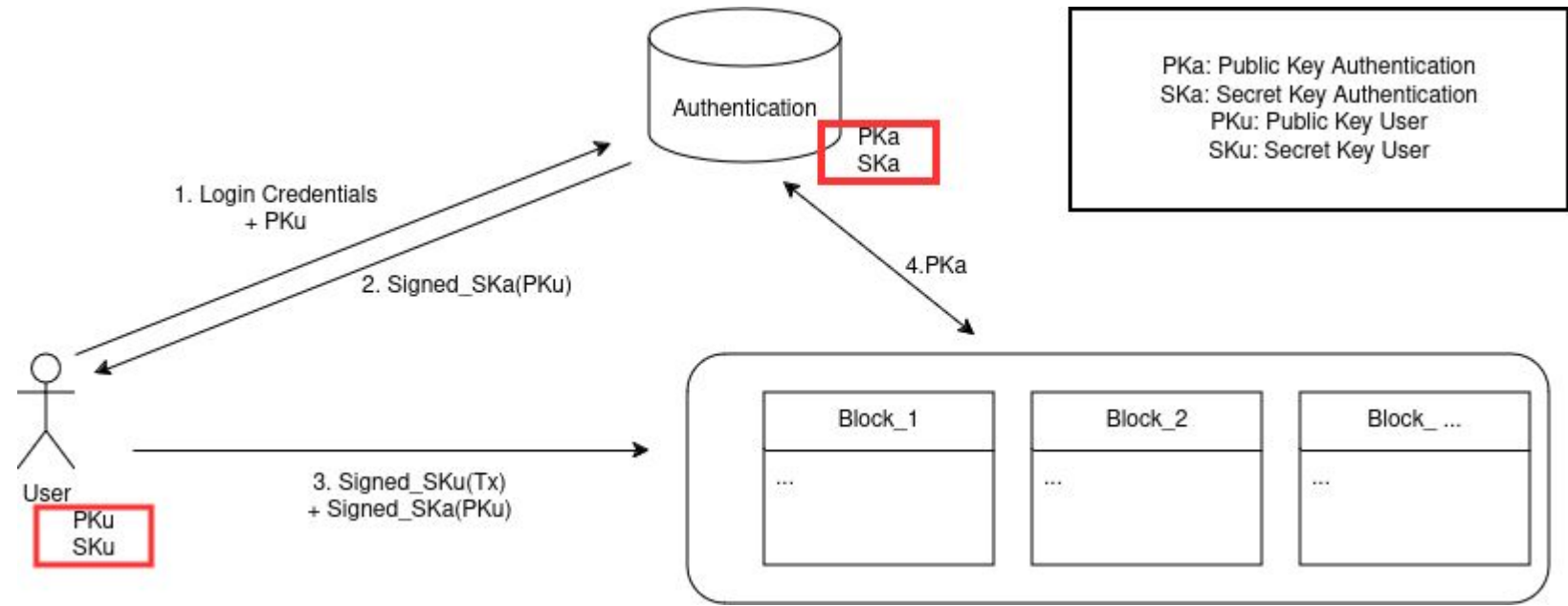D-Voting - Access control & permission management

Test Coverage:
Increase from 73.9% to 77.8%

Basic Test Scenario:
- Initialization
- Error Handling Test
- Adding/Removing Permission
- Permission Test

Implementation

Single Point Of Failure

- Authentication
- Stopping
- Authorisation

Future Work

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D-Voting - Access control & permission management

Summary

We successfully managed to move the authorization from the backend to the blockchain, removing the need for a database.

There are still single points of failure due to the centralized identity system -> future work

Questions ?

Images from https://www.flaticon.com/ & D-Voting Github Repository & DELA Github Repository

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