Account Abstraction - User Experience in Blockchain Systems

Luca Ambrosini, Giuliano Gremlich, Tommaso Agnola, Lorenzo Ronzani, Roberto Guidi, Tiziano Leidi - Istituto Sistemi Informativi e Networking (ISIN)
747
Millions of users

5
Millions of users
Problem
Why?
Are we early?
Not enough Apps?
Poor UX?
UX Problems

● Key management
  ○ Private key
  ○ Secret phrase

● Transaction fee payments
  ○ Each time you write
Techniques

- Custodial Wallets
- Meta Transaction
- Smart Contract Wallets
- Account Abstraction
Custodial Wallets 1/2

● Trusted third-party provider
● Used by exchanges
Custodial Wallets 2/2

Final user not manage keys

Centralised risks
- No control
Meta Transaction 1/2
Meta Transaction 2/2

Fee abstraction

Requires trusted relayer

- Single point of failure
- Relayer forward original sender
- No keys management
Smart Contract Wallet 1/2

- Wallet managed by Smart Contract
- Logic easy to understand
Smart Contract Wallet 2/2

- Feature flexibility
- Censorship resistant
- Keys management
- Cost to deploy
- Implementation time
- Fee abstraction
Account Abstraction 1/2
Account Abstraction 2/2

- EIP-4337
- Extends Smart Contract Wallets and Meta Transaction
  - Keys management
  - Fee abstraction
  - Not require trusted entities
  - Standard

Require ecosystem support
# Summary

<table>
<thead>
<tr>
<th></th>
<th>Custodial Wallets</th>
<th>Meta Transaction</th>
<th>Smart Contract Wallets</th>
<th>Account Abstraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trustless</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Censorship resistant</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>DApps already compatible</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Abstracts fees from user</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Ecosystem readiness</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
<td>🟢</td>
</tr>
</tbody>
</table>
Conclusion

- UX is important for blockchain wider adoption
- Account Abstraction
- Monitor technique and implementations
- March 2023 ERC-4337 launched to main net
- Visa implementation
Thank you!

Questions?
Team Presentation

Luca Ambrosini  
luca.ambrosini@supsi.ch

Giuliano Gremlich  
giuliano.gremlich@supsi.ch

Tommaso Agnola  
tommaso.agnola@supsi.ch

Lorenzo Ronzani  
lorenzo.ronzani@supsi.ch

Roberto Guidi  
roberto.gidi@supsi.ch

Tiziano Leidi  
tiziano.leidi@supsi.ch
Credits & References

Presentation template by SlidesCarnival, photographs by Unsplash, icons by Flaticon

Facebook MAU:

Ethereum MAU: https://etherscan.io/chart/active-address