Compare Ethereum and EOS.IO DApps: A rating system benchmark

Andrea Lisi
Laura Ricci

Università degli studi di Pisa

Andrea De Salve

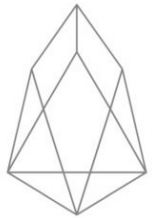
Institute of Applied Sciences, CNR Lecce

Paolo Mori

Istituto Informatica e Telematica, CNR Pisa

DLT2021 - The Internet

Outline



1. Background and problem statement
2. EOS.IO
3. System model, prototype and comparison
4. Conclusions

Background and Problem statement

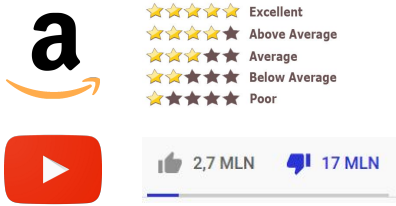
Recommender and rating systems

Platforms collecting and suggesting products and services to users

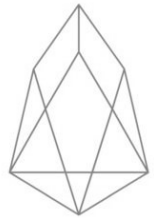
User input data: the **Rating**

- Star score system, Like/Dislike, Only like, etc

Gamification features to attract users

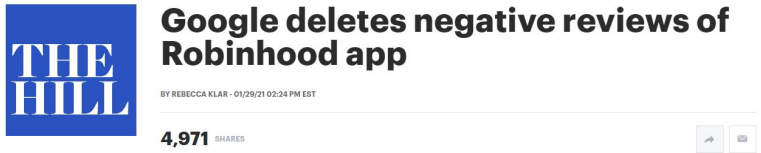


Recommender and rating systems



Problem statement: Centralized systems, risk of rating manipulation[Salah]

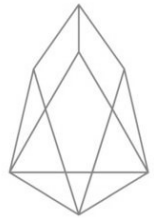
[THEHILL]



[CNN]

[BBC]

Recommender and rating systems



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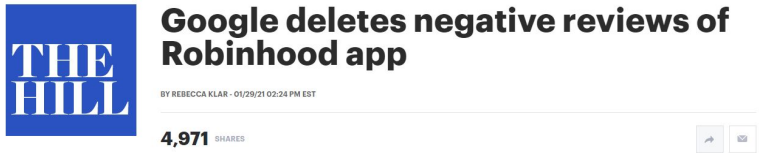
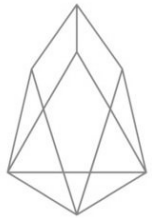


[CNN]

[BBC]

Discussion point: Should a service provider arbitrarily remove reviews? What if it has been asked by an item owner?

Our research

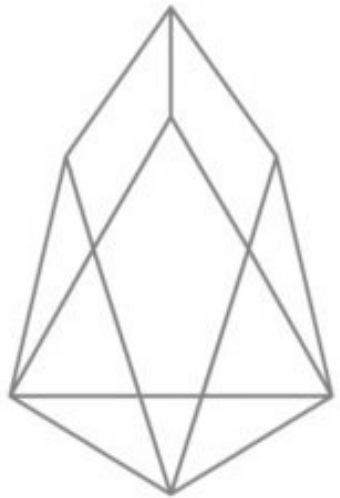


Previous work:
Grant immutability recordkeeping to reviews[GEC]
Add user incentives[FGC]

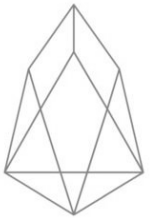
Problem: a lot of data, high fees on Ethereum

Current: Explore alternatives, EOS.IO

EOS.IO



Differences with Ethereum



Consensus	Proof of Work	Delegated Proof of Stake
Architecture	Permissionless	Permissioned
Block production rate	10-19 sec	0.5 sec
Confirmation time	1 min	1 sec
TPS (transactions per second)	15-25	4000+
Language	Solidity	C++

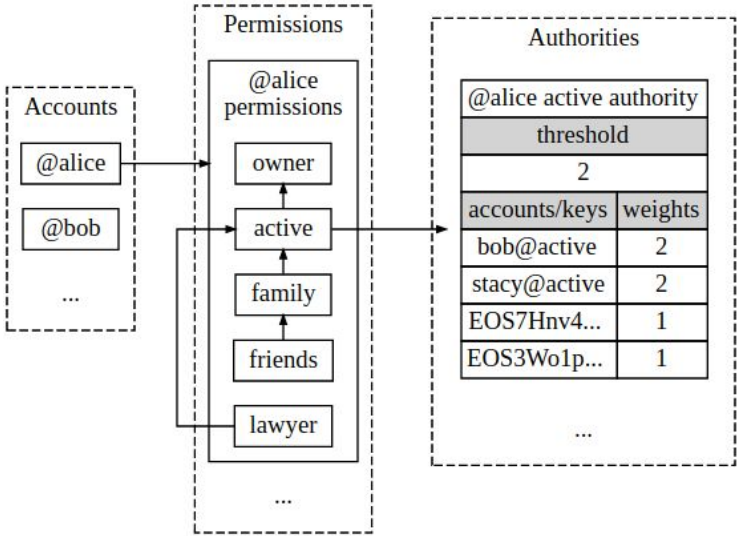
[EOS] [Garriga]

Accounts

Custom name of 12 characters, unique, and a hierarchy of permissions:

- **Owner:** account management
- **Active:** transactions, staking
- **Custom:** custom actions

A **weight** associated to an account to meet the permission **threshold** to execute the correspondent action

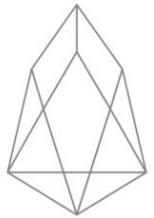


Fee model

Three resources determine the fee:

1. **RAM (bytes)**: the size of the account stored data (keys, contract, etc)
2. **CPU (µs)**: complexity of the code executed
3. **NET (bytes)**: how many data are sent to the validators

Fee model



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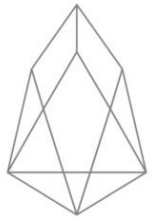
Accounts **buy** RAM to store data

- RAM is scarce resource
- RAM can be sold, Barcot algorithm to determine RAM pricing[RAM]

Fee model



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Accounts **stake** EOS to “rent” CPU and NET for the next three days[STAKE]

- Transactions consumes CPU and NET; they replenish in three days
- Limits the transaction rate of an account, prevent DoS attacks

Trivia

The project ICO raised 4 billion USD without a live product[CNBC]

The EOS mainnet hosts **Everpedia**, an encyclopedia DApp

Discussion point: Is EOS.IO a promising technology?

System model, prototype and comparison

System model

Customer
(User)

Asks for a service

Pays

Grants the permission to rate

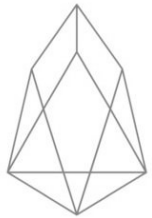
Leaves a rating

Rewards

Restaurant
(Item owner)

Provide a service

Persistent storage



Persistent storage uses *multi-index tables* referenced by a *uint64* primary keys

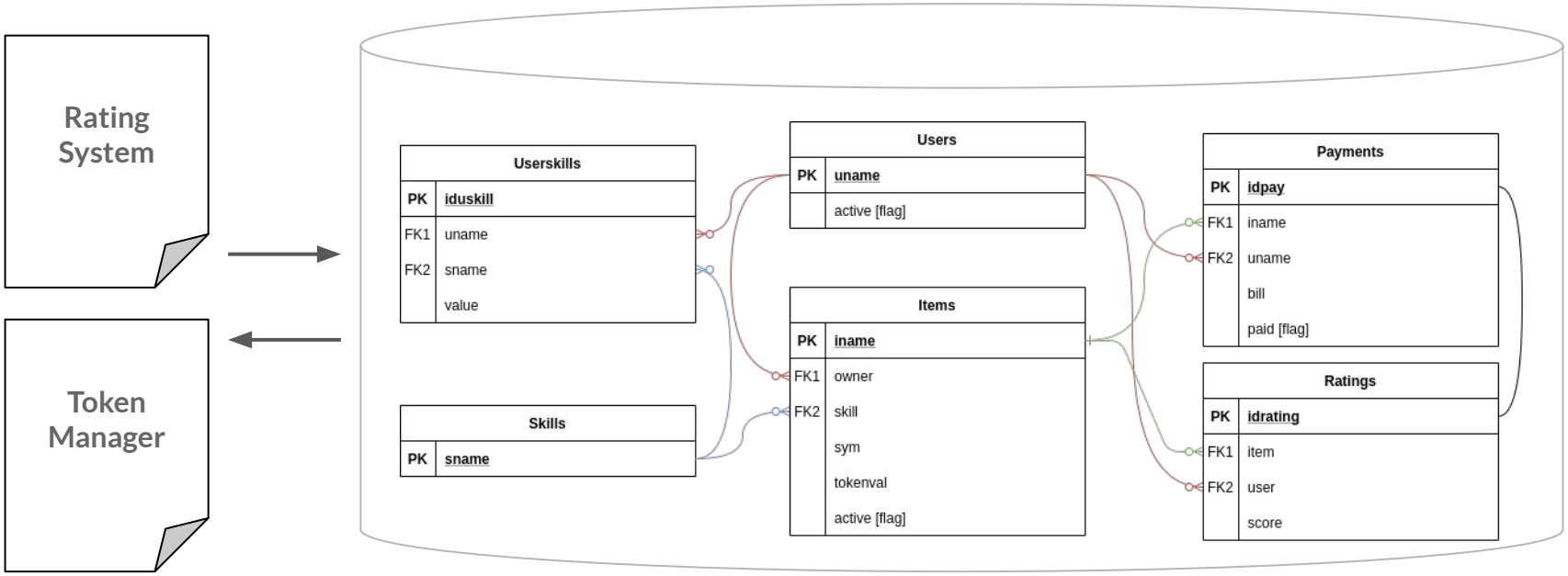
- Stored in block producer's RAM

Smart contracts provide *Actions* to interact with tables

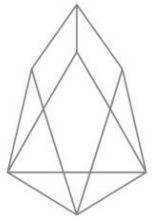
The blockchain stores the log of all Actions, which allow to re-build an application's state

[EOS]

Persistent storage



Comparison with Ethereum



Storage in tabular data structure

Fee computed proportional to RAM, CPU, NET

CPU and NET fees returned after three days

Storage in the smart contract, arrays and mappings

Fee computed proportional to Gas used

Full fee spent, no returns

Comparison with Ethereum

1 EOS : 3,57 €

24 March 2021

1 ETH : 1.450,22 €

Operation	**Payer**	**EOS.IO: Fee with stake**		**EOS.IO: Fee after unstake**		**Ethereum: Fee spent**	
		EOS	€	EOS	€	ETH	€
Register a User	User / Item owner	1,075	3,84	0,005	0,017	0,0630	91,36
Create an Item	Item owner	1,508	5,38	0,005	0,017	0,0299	43,36
Grant permission	Item owner	1,844	6,58	0,036	0,13	0,0011	1,59
Payment	User	1,183	4,22	0,016	0,057	0,0011	1,59
Add rating	User	1,053	3,76	0,016	0,057	0,0052	7,54

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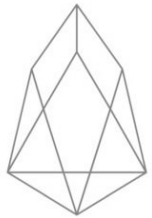
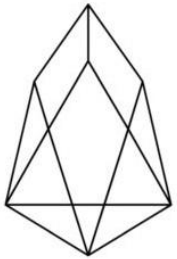


Discussion point: Is the fee market enough to claim an EOS.IO DApp is strictly better than an Ethereum one?

Discussion point: What is the current research interest in DApps?



Conclusions

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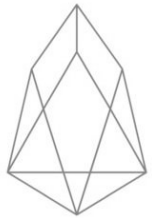


Developing DApps on EOS.IO is more flexible and powerful

- C++ functionalities
- Cheaper fee model

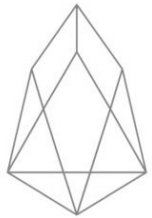
However, Ethereum has a much larger community, best practices, tools, and troubleshooting support

- Moreover, Ethereum 2.0 is launching

Thank you!

andrea.lisi@phd.unipi.it

References



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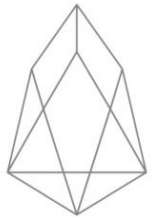

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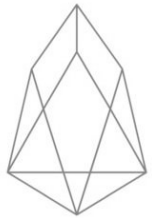
Discussion time



Should a service provider arbitrarily remove reviews?
What if it has been asked by an item owner?

Is the fee market enough to claim an EOS.IO DApp is strictly better than an Ethereum one?

Is EOS.IO a promising technology? Is it as decentralized as Ethereum, or not?

What is the current research interest in DApps?