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RIDE
Rights of Internet of Everything

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Ensuring Personal Data Anonymity in Data Marketplaces through Sensing-as-a-Service and DLTs

Overview

1. Personal Data
2. Anonymization by Aggregation
3. Service Design
4. Conclusion

Personal Data

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- These data transactions happen with **no transparency** for individuals, that are not capable of determining the **fate** of their personal data

Databox: Personal Data Management and Interoperability

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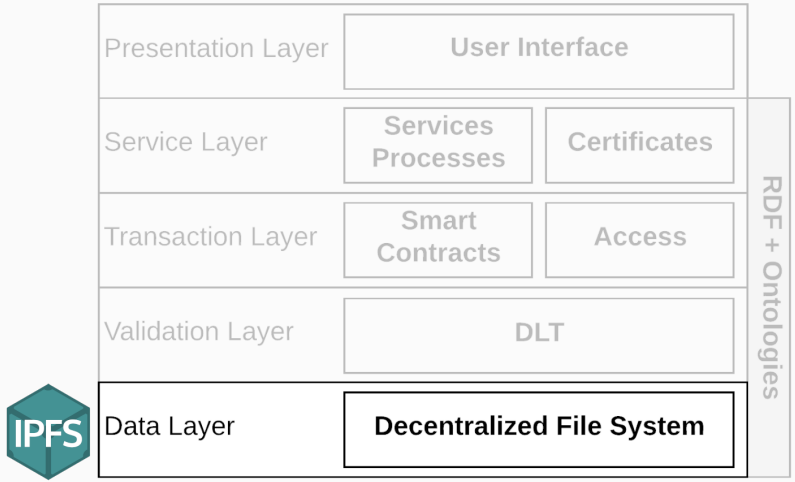
- moves towards the use of personal data for **data markets** and **social good**
- user shares his data by defining some **policies** and preferences in compliance with GDPR

Databox Model Layered Architecture



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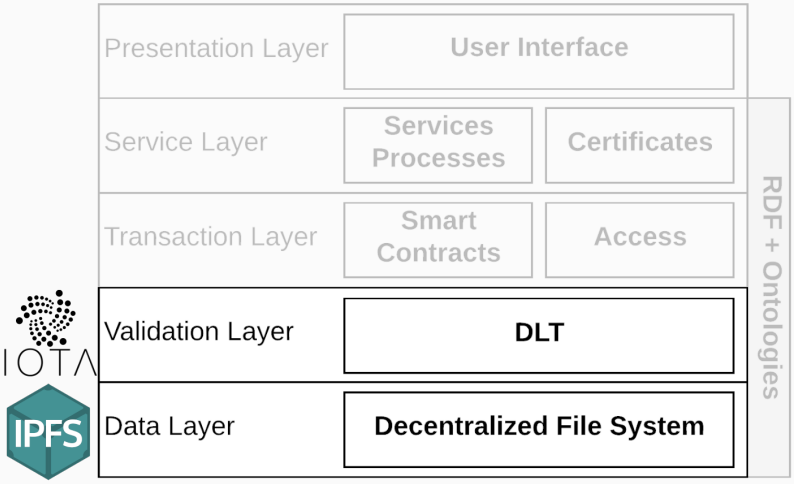

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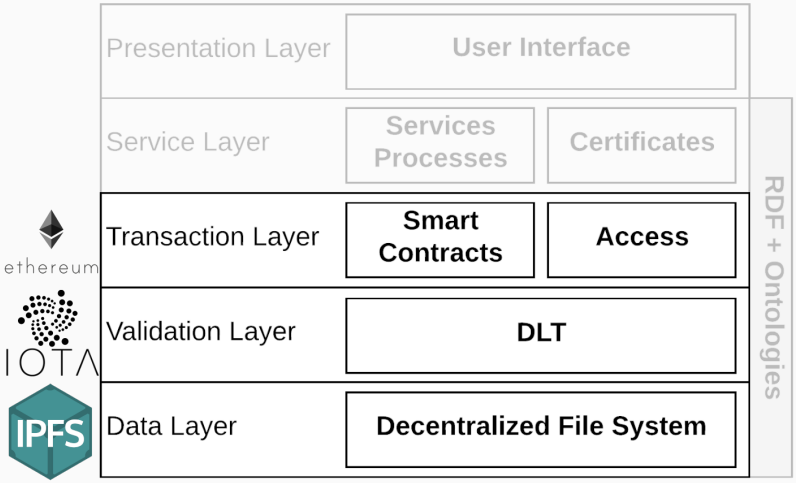

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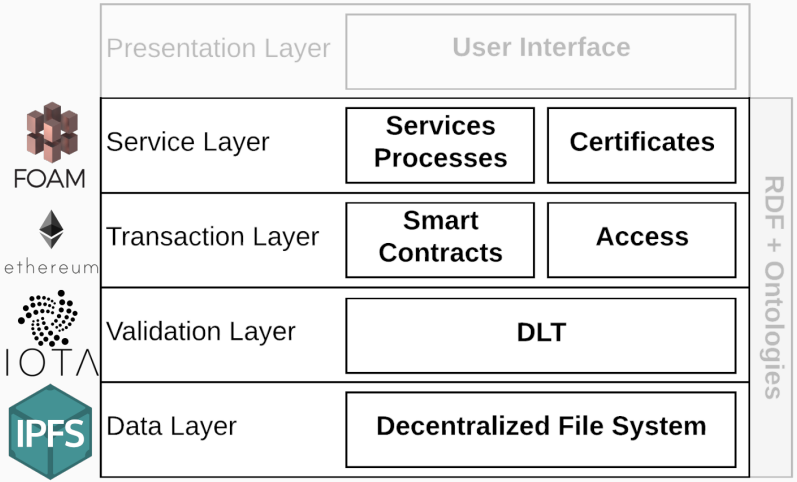

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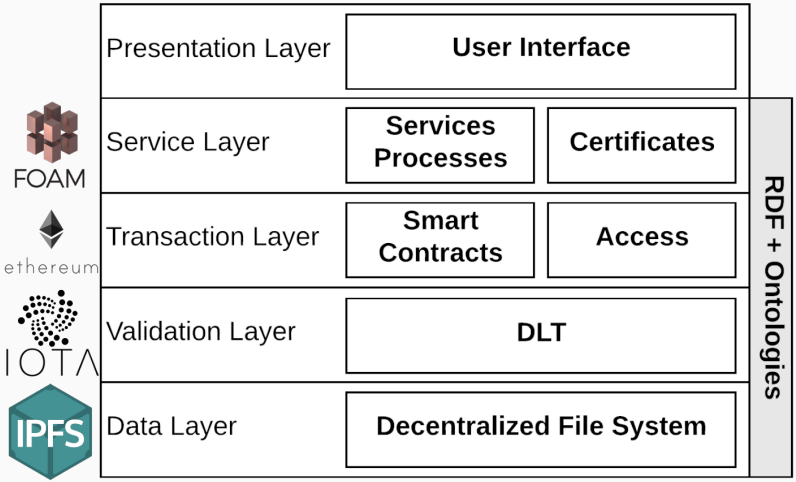

Anonymization by Aggregation

Data Protection Techniques

Removing the association between an individual identifier (e.g. name) and a dataset is not enough

Data Protection Techniques

- ***k*-anonymity**
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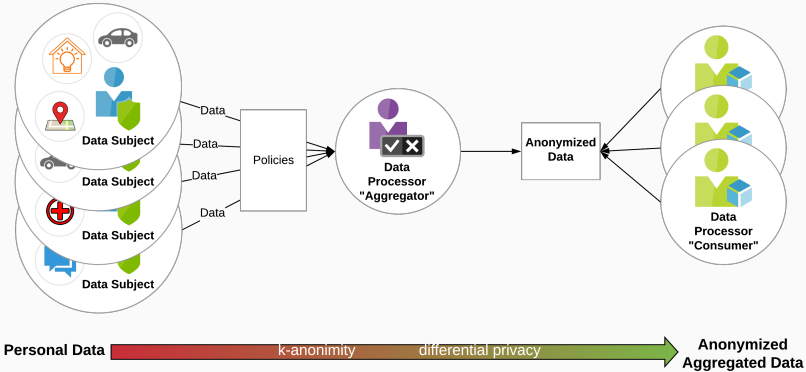
- **Differential Privacy**
  It is traditionally enforced by adding noise to the data released (typically using the Laplace distribution). Knowing the noise distribution allows to compensate the error when analyzing release.

Sensing-as-a-Service



SaaS has been introduced as a solution based on **IoT** infrastructures, usually implemented as a middleware that **aggregates** data coming from multiple sources, following specific **policies**

Service Design

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By combining two kind of contracts data privacy can be incremented, leaving traces of the data flow and giving incentives to all the actors that correctly behave.

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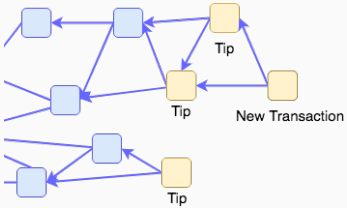
- An **Access Control List (ACL)** that associates an Ethereum address to a bundle of data
- Each feature’s data is maintained in different **MAM channels** →

IOTA MAM Channels



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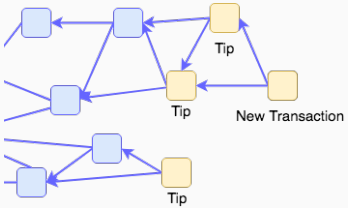

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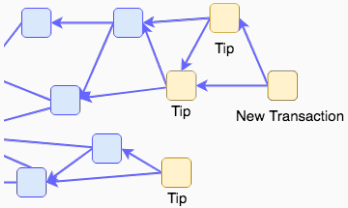

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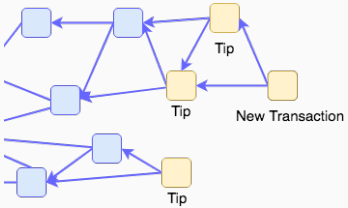

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- MAM channels take the form of a **linked list** of transactions ordered in chronological order

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   - The k-DAO indeed, in every moment can decide to **vote** to redeem this deposit if the aggregator **misbehaves**.

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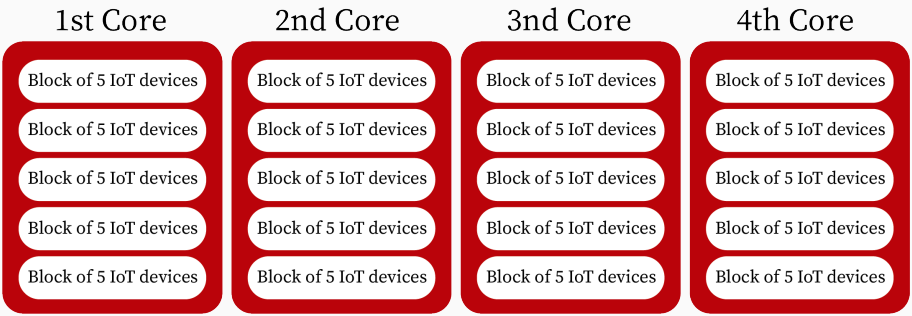
   - Up to $n < k$ (with n predefined) can ask for a Proof of Sensing to the aggregator in order to check **quality of data**

Evaluation: is IOTA network currently a suitable solution for IoT data?

We simulated up to **100 devices** that issue data to MAM Channels, querying randomly between **71 public IOTA full nodes** (remote PoW)



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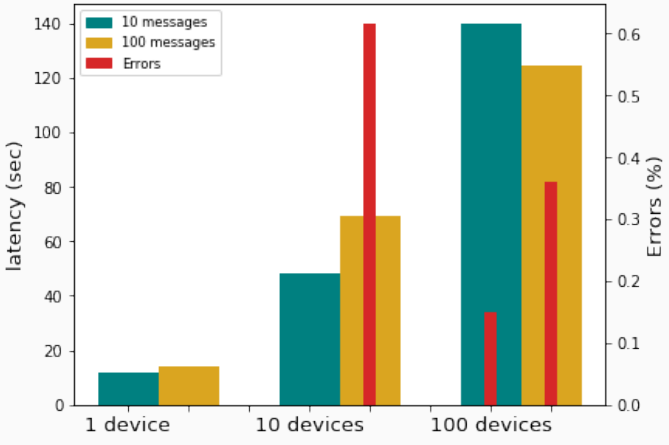

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