

# Decentralized Data Marketplace

## Agenda

11:30-11:45 Check-In, Networking

11:45-12:30 DDM Overview,  
Discussion

12:45 Announcements,  
Networking

Active Planning Committee

John Lindsay, Patent Attorney

***See me to become more active in this or other chapters  
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# Decentralized Data Marketplace

## An IoT Community Marketplace for Smart Cities



I<sup>3</sup>

*Intelligent IoT Integrator*

One of the ways in which a city can become smarter is to grow a local economy around the sharing of data from IoT devices and other open data that can be used in applications to improve the lives of its citizens

For more details, please visit <http://i3.usc.edu/>



# Decentralized Data Marketplace



Data is not the new oil  
(its value is not based on scarcity)

Data increases in value  
the more it is connected

# Decentralized Data Marketplace

## Internet of Things (IoT) in Cities

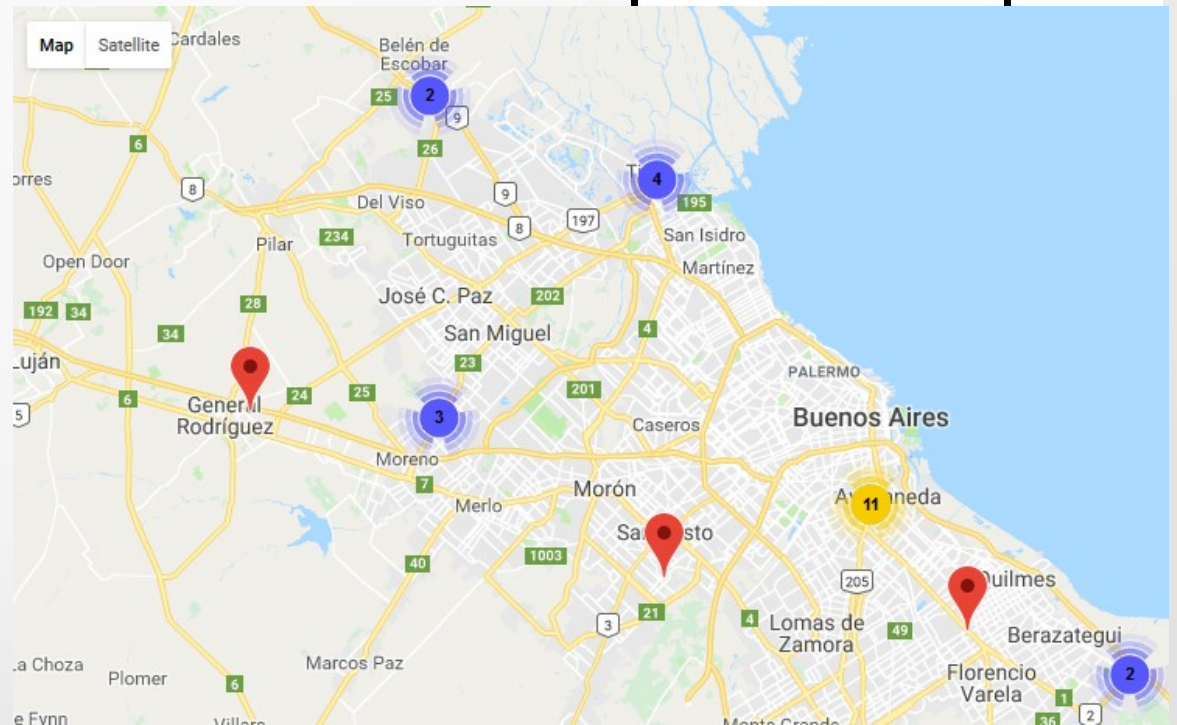
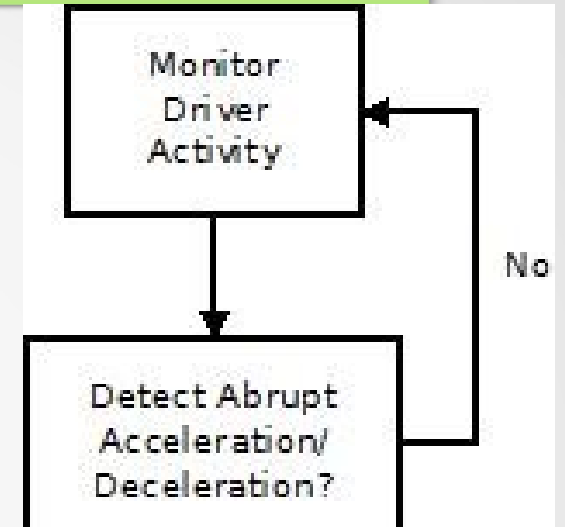
- Applications and uses for IoT, involving real-time data streams, are growing:
  - Vehicular traffic sensing
  - Parking Meters
  - Security
  - Air quality monitoring
  - Smart Trash Cans

## IoT 1.0 and Challenges

- IoT 1.0: A single organization deploys and maintains devices, network, middleware, cloud-based processing, end-user application
- This is a data siloes approach that does not scale and inhibits technology deployment.
- Cities are leery of single-vendor lock-in

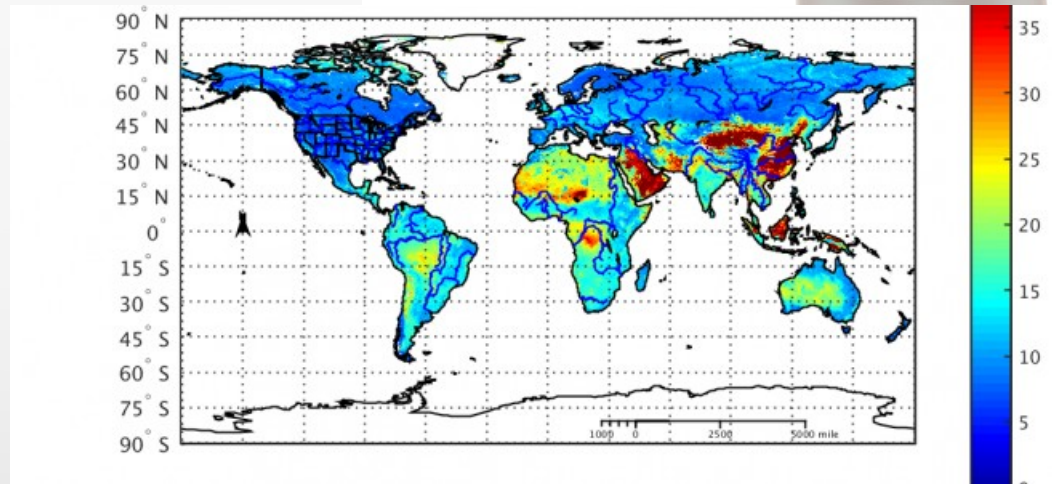
# Sensor Data Based Smart City App 1

- Application (“Coaster”)
  - Map clusters of harsh braking
- Sensor Data
  - Accelerometer, GPS (~10 times per second)
- Network
  - Cellular carrier
- Storage
  - Firebase



# Sensor Data Based Smart City App 2

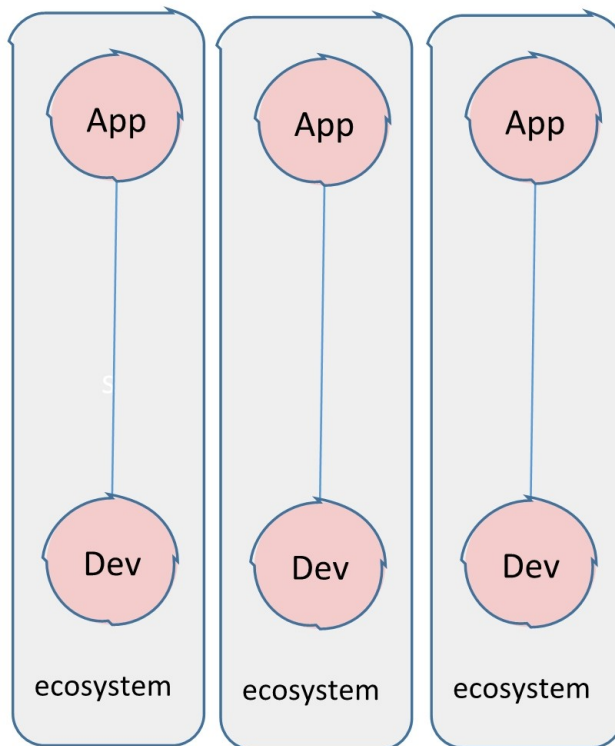
- Application (“Array of Things” subset)
  - “Google Maps of air pollution”
- Sensor Data
  - Air particle sensors
- Network
  - Wired/Wifi
- Storage
  - Single host (API)



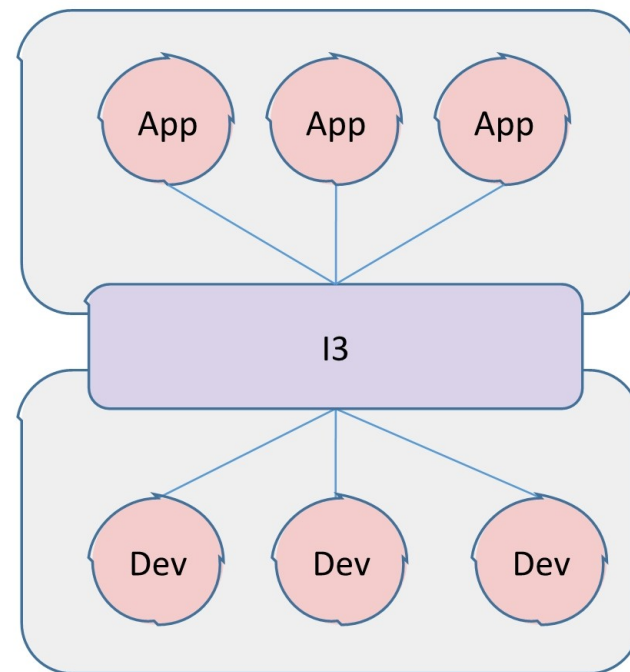
# Decentralized Data Marketplace

## Interoperability at the Data Layer

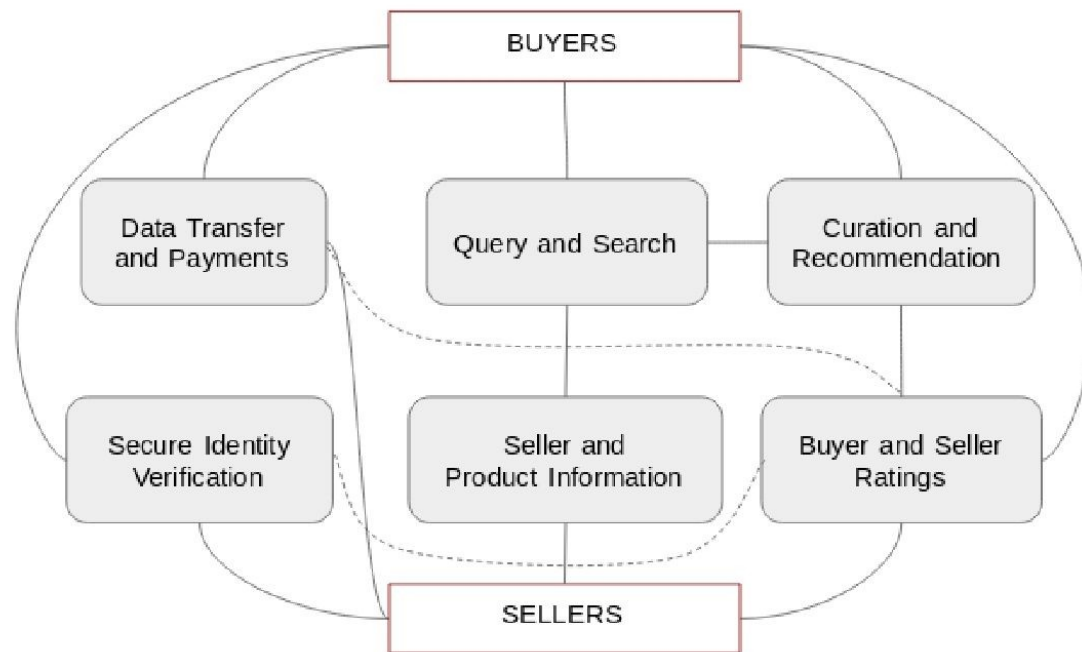
From:



To:



# Decentralized Data Marketplace



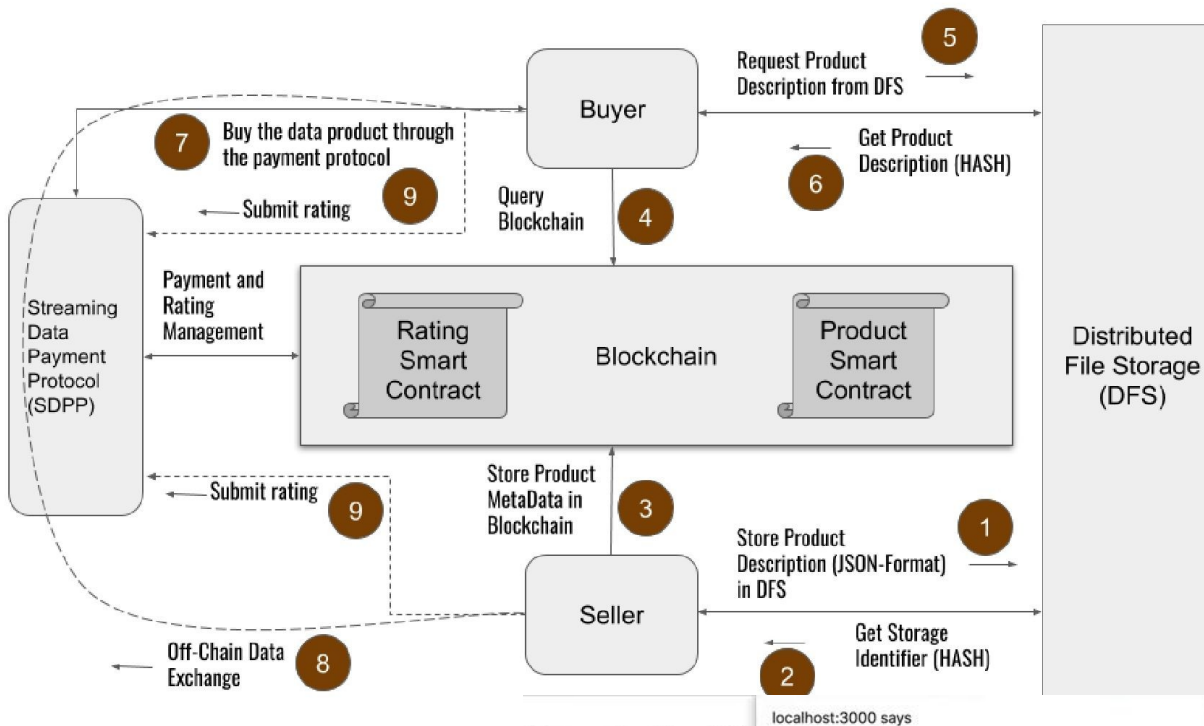
## What does Decentralized mean? What are the possible Benefits?

- The marketplace doesn't depend on a central server hosted by a "trusted" third-party
  - Resistant to data tampering
  - Minimize manipulation of ratings, recommendations
  - Eliminate monopoly power of market platform operators
- Peer to peer data connections with seamless payments for streaming data

- Posting and Discovery
  - "Website" ("serverless")
- Storage
  - Decentralized file storage
- Payment
  - Peer to peer
- Data Exchange
  - Peer to peer
- Data Quality – Ratings
  - No controller



# Decentralized Data Marketplace



Seller (Steps 1 -3)  
 Sensor Data Product Description  
 Formatted Description  
 Store to IPFS  
 Store Metadata

```

Product Description Template
{
  "Product Type": "Sensor",
  "Peripheral Sensor": "Temperature Sensor",
  "Product Description": "TMP36 temperature sensor deployed
  outdoor.",
  "Latitude": "34.022596",
  "Longitude": "-118.28443",
  "Price per Data Unit in USD": 1.5,
  "Data Unit": "100 data points",
  "IP Address or Hostname": "xxx-xxx-xxx-xxx",
  "Public Address":
  "0x32590bb72050e53df34676f9a75c17a0677866c7",
  "Seller Credentials": "xxxxxxxxxxxxxxxx"
}
    
```

Decentralized Data Marketplace

localhost:3000 says  
Register Success!

OK

Type:  Latitude:

Seller:  Price in USD:

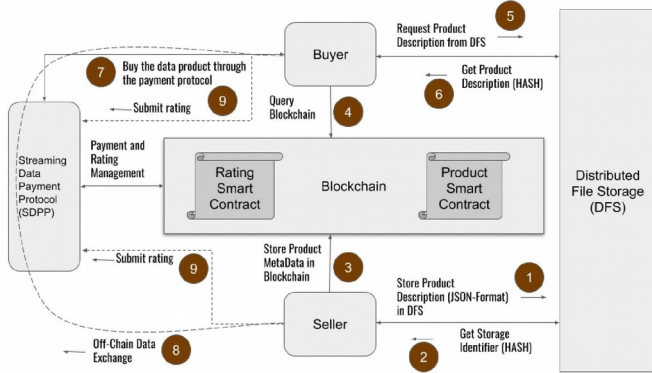
Peripheral Sensor:  IP Address:

Description:  Public Address:

Longitude:

Register

# Decentralized Data Marketplace



Buyer (Steps 4 -6)  
Query data products

Purchase (Steps 7-9)  
Buy  
P2P data exchange (SDPP, work ongoing)

Seller	Peripheral Sensor	Product Description	Price in USD
Demo	gas	Gas data	0.2

Seed : RAHULRAHULRAHULRAHULRAHULR

Quantity : 10

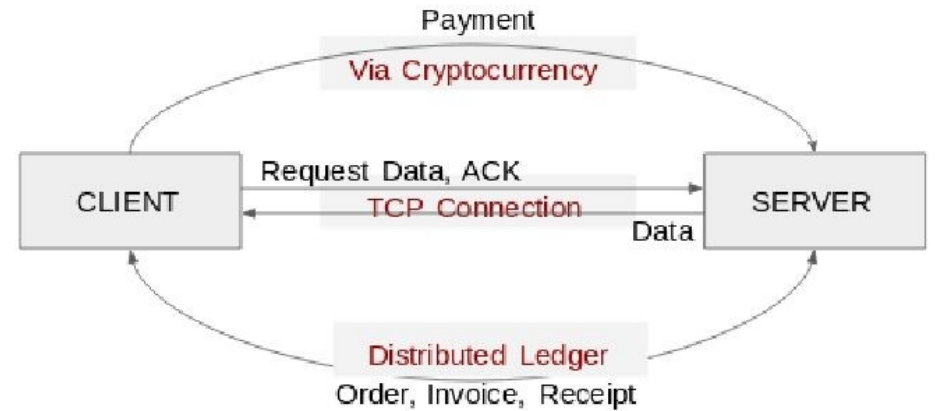
[Buy!](#)

Data Flow logs URL

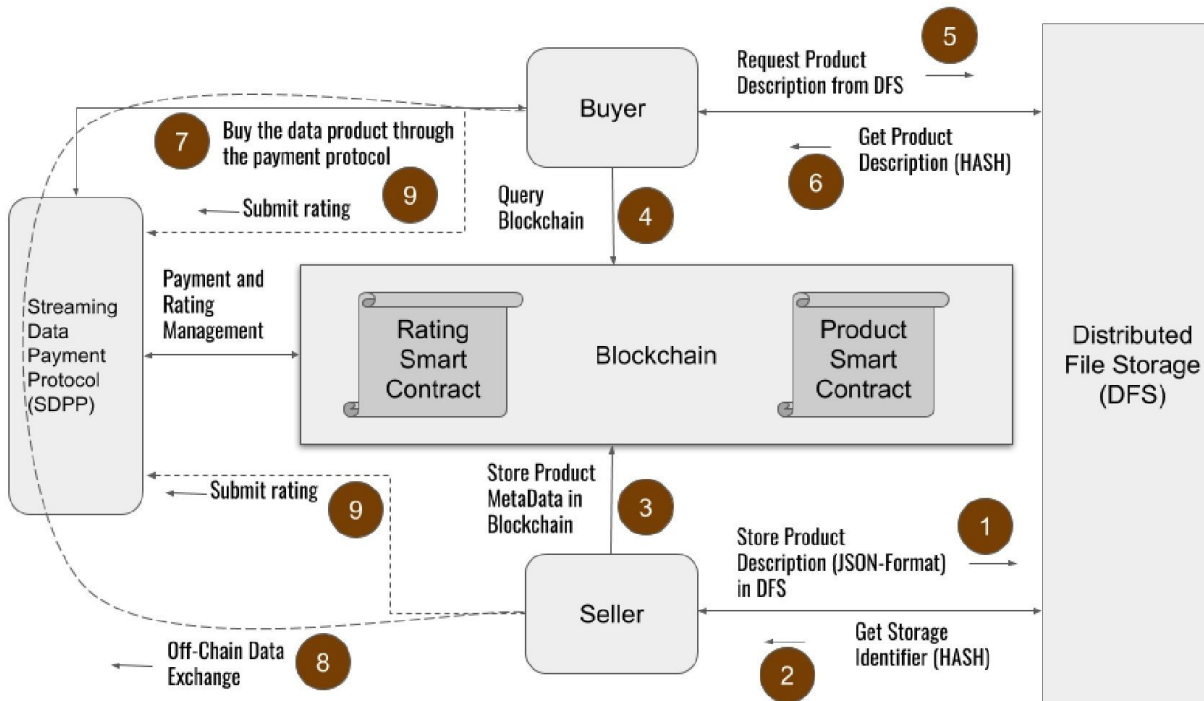
No data

```
Terminal Shell Edit View Window Help
sdpp_seller — Python seller_websockets.py — 178x44
/Users/rahul/iota/dummy/DDM/sdpp_seller — Python seller_websockets.py
...dummy/DDM/ddm_web_winnny — node - npm
guest-wireless-upc-1607-10-120-126-127:sdpp_seller rahul$ python3 seller_websockets.py

Data Transfer starts!
['1', '2', '3', '4', '5', '6', '7', '8', '9', '10', '11']
Invoice - https://thetangle.org/bundle/VZ9J9BCCXKEHVJPKJDNJKCP00ULQFLAVRJEISSYHEZBNDYIONZLOCAUAEDNMAILAIUVNUWXRIA9XXKGTA
Invoice - https://thetangle.org/bundle/FLAVBJXHZHDXDXDINEKUJAYQAHXLXQXVZAKZWCIBXZJAGBFTWEWPACKAVKRNCHBWJEBOEKICFBBCAPXXKEW
Invoice - https://thetangle.org/bundle/DHZIBPU0XA9N1LPJETRTK9ZF9LRTNWLX9EELJDTWKEINJRKTYRGGDDZEKJX9LXILSKKTWHHKXSYRKRED
Data Transfer completed!
```

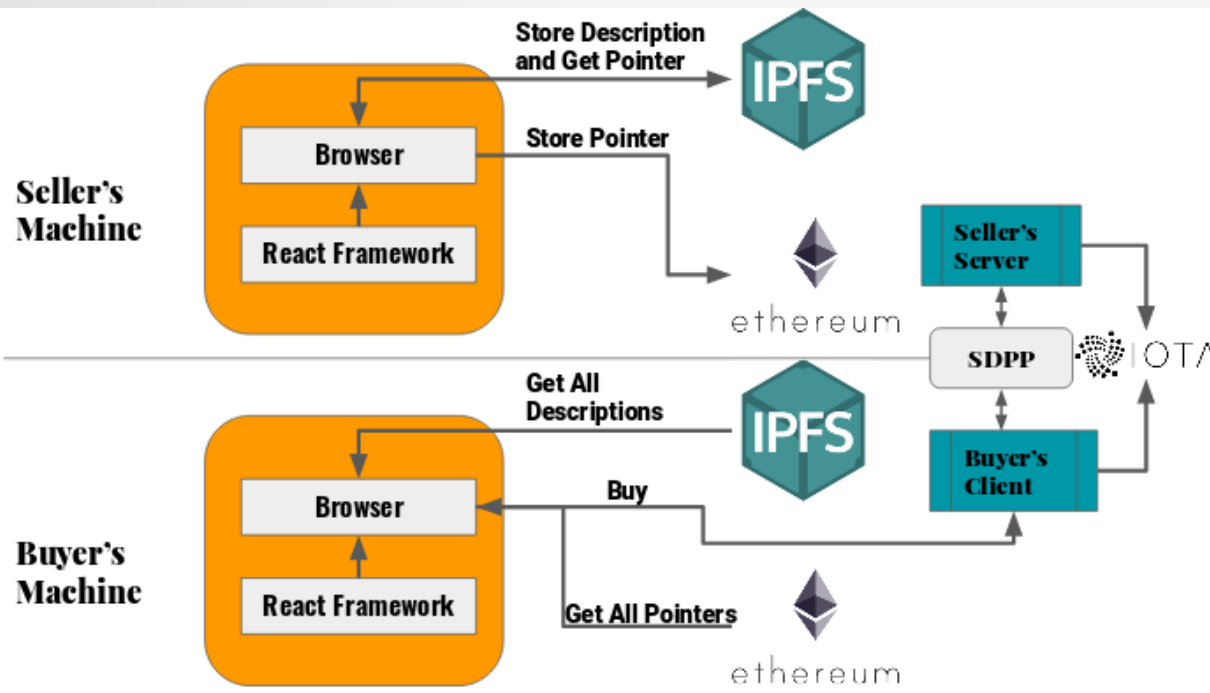


# Decentralized Data Marketplace



Rating  
Seller  
Buyer  
Crypto supported  
transaction  
Token Curated Rating

# Decentralized Data Marketplace



Proof of Concept  
Posting and Discovery  
ReactJS("serverless")  
Storage  
IPFS (decentralized)  
Payment  
IOTA/Ethereum  
Data Exchange  
SDPP  
Data Quality  
Token (Ethereum)

[I3 Demo Video](#)

# Decentralized Data Marketplace

How might those samples apps exist within DDM?  
How might the decentralization add/detract from an application?

What use cases suit fit/don't suit DDM?

Does DDM enable new business models?

How does DDM overcome vendor lock-in? At what cost?

What does DDM add over IOTA, M2X, Android OS, ...?

Comments/Questions?

John Lindsay

Patent Attorney

Coaster, Smooth Driver Application