From: Privacy
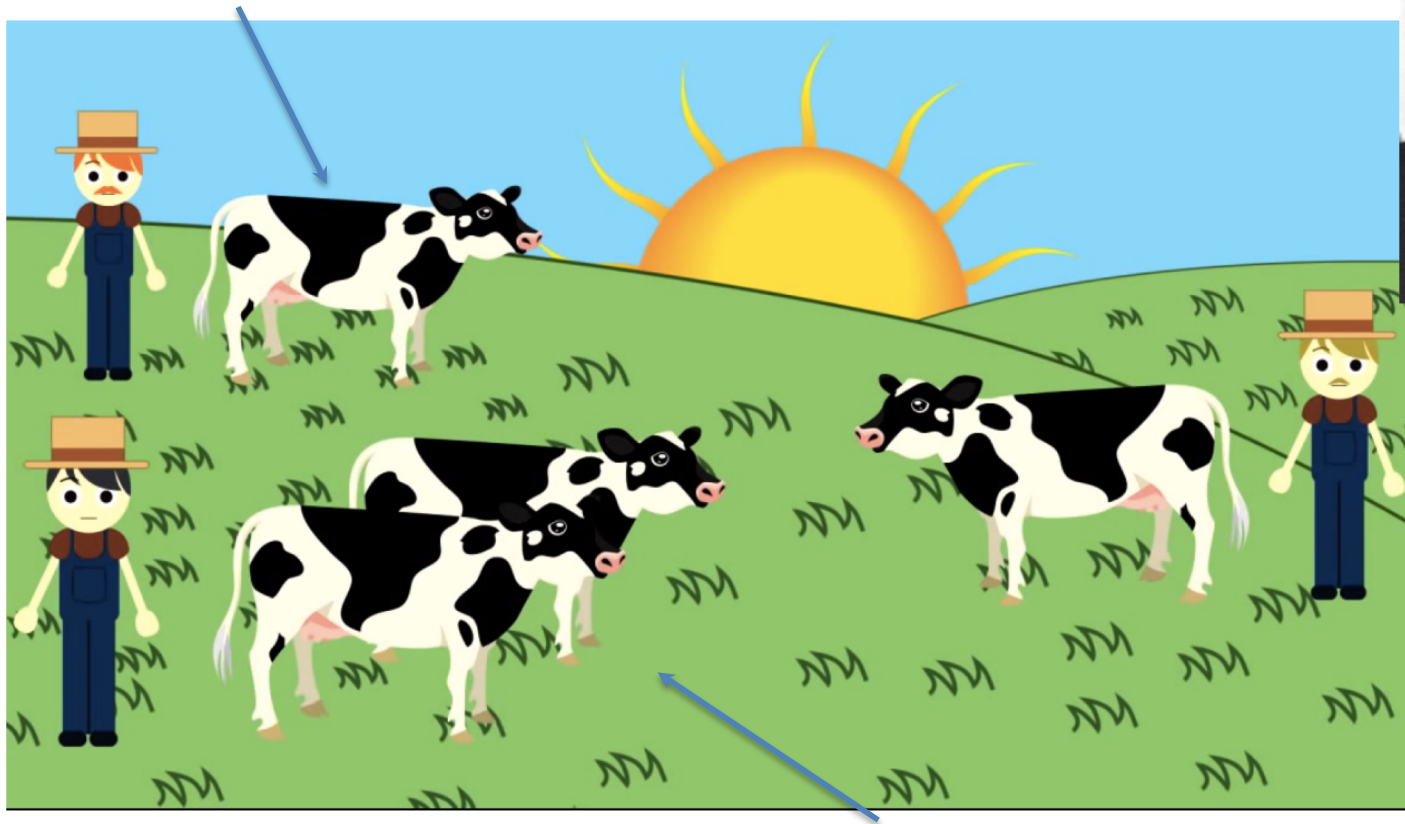# To: Human-Centric Economics

Nikolaos Laoutaris

Research Professor
IMDEA Networks Institute

Tragedy of the commons around privacy

Garrett Hardin, 1968

Internet company in
Web Economy … crossing privacy red lines

The "commons": consumer trust on the web and it's business models

Big Idea #1 - Obvious in retrospect
The importance of Transparency (Software)

"Sunlight is the best disinfectant."

-LOUIS BRANDEIS

"Publicity is justly commended as a remedy for social and industrial diseases. Sunlight is said to be the best of disinfectants; electric light the most efficient policeman."

—U.S. Supreme Court Justice Louis D. Brandeis, "What Publicity Can Do," *Harper's Weekly*, December 20, 1913

A first of its kind Transparency Tool

$heriff
Detecting Price Discrimination

1. Select price

Availability: In Stock

Price: ~~$200.50~~ $189.00
Ex Tax: $90.00
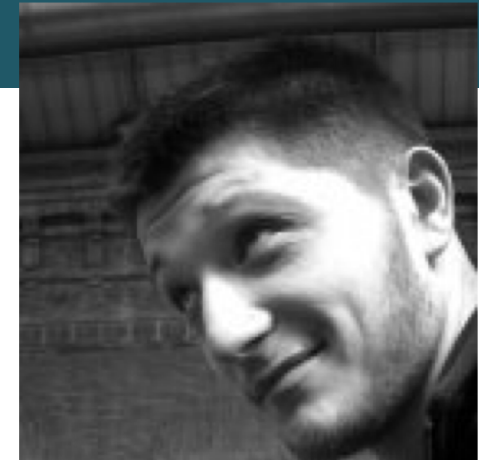Price in reward points: 400

10 or more $105.40
20 or more $92.48

3. Examine differences

S, Safari, Spain	$189.00
Firefox, Spain	$189.00
m, Liège	$165.99
São Paulo	$189.00
d, Tampere	$189.00
any, Berlin	$201.50

2. Check it

M

189.00

Check it

Jakub Mikians
UPC (now Amazon)

Kostas Iordanou
Telefonica-UC3M

Detects & annotates all rendered ads

Check your browsing history using the eyeWnder analysis tool: [Analysis Tool]

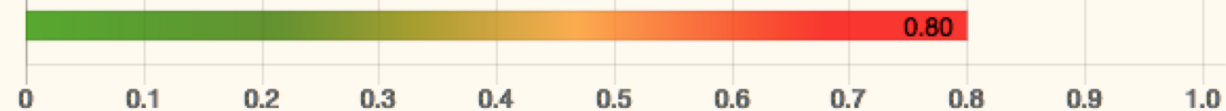## Selected Advertisement

User Feedback: Do you think it was a targeted ad? [▲▼]

Users Demographics Similarity

How similar are you to others that have seen this ad?	Seen by 3 users (0 = Not so Similar, 1 = Very Similar) Show more
	0.80
	0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

Advertisement Information Table

This ad takes you to:	https://subscribe.wired.com/subscribe/wired/103100?source=WIR_Footer_IntlTargeting_Apr16
This ad is about:	People & Society > Men's Interests Books & Literature > Magazines News > Technology News

[Analyze Advertisement]

[Get Intermediaries]

eyeWnder ©

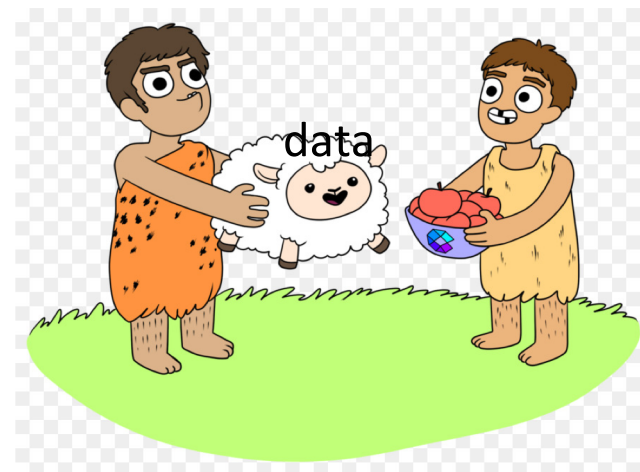# Big Idea #2 - NOT obvious even in retrospect

Most problems of the web are due to its broken economics model

- Free data
- For free service
  - payment "in kind"
  - no cash

You   Online Service

data

BAD for privacy!

(tracking is cheap)
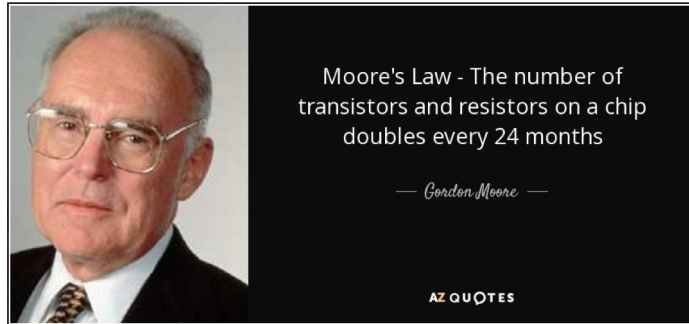
(no payments to users)

(collect ... everything)

Moore's Law - The number of transistors and resistors on a chip doubles every 24 months

— *Gordon Moore* —

AZ QUOTES

+

You   Online Service

data

maps
email
search

=

ALL YOU CAN EAT
BUFFET

ALL YOU CAN EAT
BUFFET

=

SPAM
Classic

=
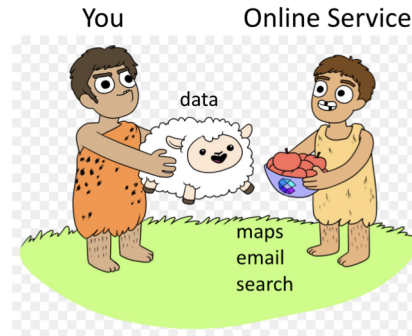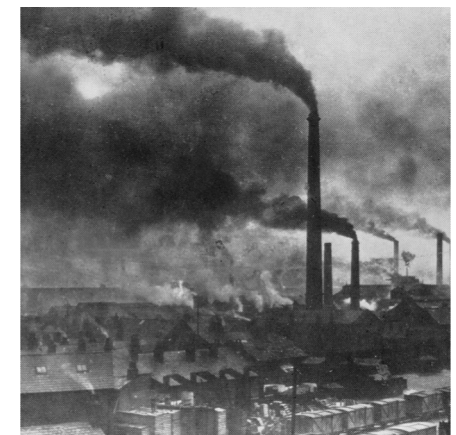
BAD for sustainability!

Entities trading with data

Who we are / What we do

The Data Transparency Group tackles important problems on the forefront of the interplay between technology, society, public policy, and economics

Home

The Data Transparency Group (DTG) is employing a mix of network measurements, distributed systems building, algorithms, and machine learning to study problems and propose solutions to transparency issues related to data privacy, the economics of d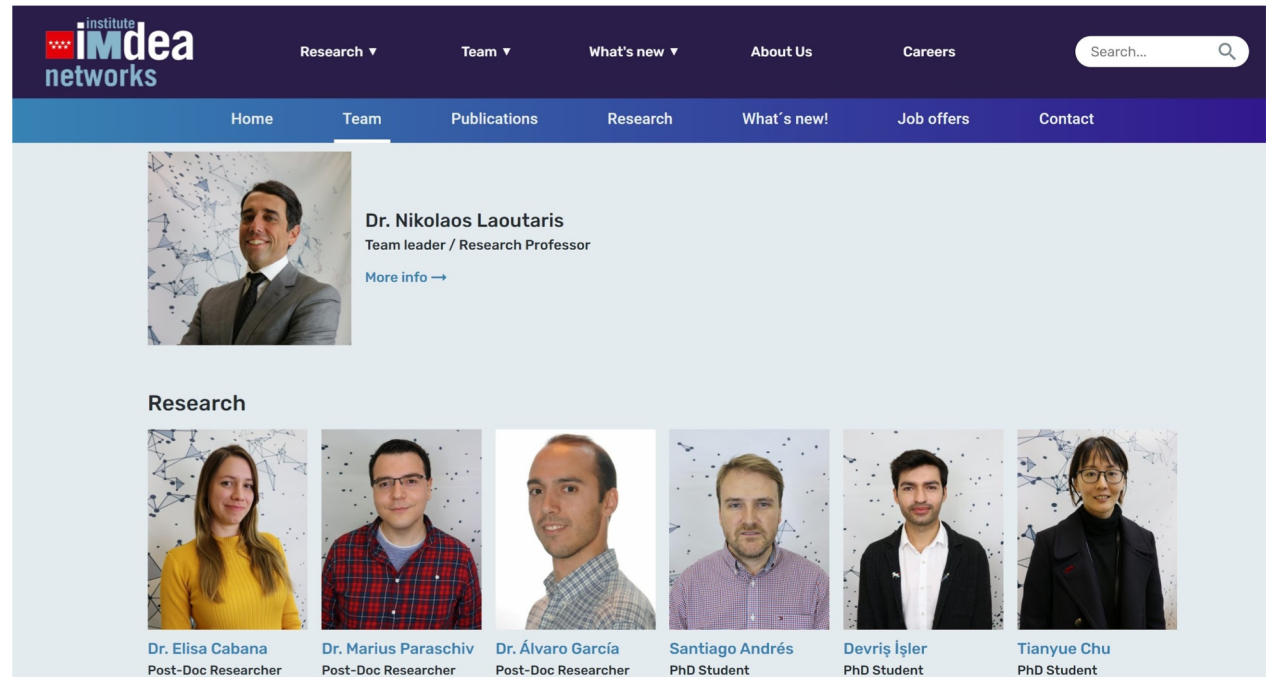ata, information and disinformation spread, and automated decision making via machine learning algorithms. The objective of the group is to tackle important

Dr. Nikolaos Laoutaris
Team leader / Research Professor
More info →

Research

Dr. Elisa Cabana — Post-Doc Researcher
Dr. Marius Paraschiv — Post-Doc Researcher
Dr. Álvaro García — Post-Doc Researcher
Santiago Andrés — PhD Student
Devriş İşler — PhD Student
Tianyue Chu — PhD Student

PIMCity

PIMCITY PROJECT

PIMCity project has received funding from the European Union Horizon 2020 Research and Innovation Programme under Grant Agreement No. 871370

European Commission | Horizon 2020 European Union funding for Research & Innovation

1. Pricing of personal & aggregated data
2. Ownership of data
3. Data marketplace design

A quiz

How valuable is this?   How about this?

A quiz

And this?

age	workclass	fnlwgt	education	education-num	marital-status	occupation	relationship	race	sex	capital-gain	capital-loss	hours-per-week	native-country
38	Private	215646	HS-grad	9	Divorced	Handlers-cleaners	Not-in-family	White	Male	0	0	40	United-States
53	Private	234721	11th	7	Married-civ-spouse	Handlers-cleaners	Husband	Black	Male	0	0	40	United-States
28	Private	338409	Bachelors	13	Married-civ-spouse	Prof-specialty	Wife	Black	Female	0	0	40	Cuba
37	Private	284582	Masters	14	Married-civ-spouse	Exec-managerial	Wife	White	Female	0	0	40	United-States
49	Private	160187	9th	5	Married-spouse-absent	Other-service	Not-in-family	Black	Female	0	0	16	Jamaica
52	Self-emp-not-inc	209642	HS-grad	9	Married-civ-spouse	Exec-managerial	Husband	White	Male	0	0	45	United-States
31	Private	45781	Masters	14	Never-married	Prof-specialty	Not-in-family	White	Female	14084	0	50	United-States
42	Private	159449	Bachelors	13	Married-civ-spouse	Exec-managerial	Husband	White	Male	5178	0	40	United-States
37	Private	280464	Some-college	10	Married-civ-spouse	Exec-managerial	Husband	Black	Male	0	0	80	United-States
30	State-gov	141297	Bachelors	13	Married-civ-spouse	Prof-specialty	Husband	Asian-Pac-Islander	Male	0	0	40	India
23	Private	122272	Bachelors	13	Never-married	Adm-clerical	Own-child	White	Female	0	0	30	United-States
32	Private	205019	Assoc-acdm	12	Never-married	Sales	Not-in-family	Black	Male	0	0	50	United-States
40	Private	121772	Assoc-voc	11	Married-civ-spouse	Craft-repair	Husband	Asian-Pac-Islander	Male	0	0	40	?
34	Private	245487	7th-8th	4	Married-civ-spouse	Transport-moving	Husband	Amer-Indian-Eskimo	Male	0	0	45	Mexico
25	Self-emp-not-inc	176756	HS-grad	9	Never-married	Farming-fishing	Own-child	White	Male	0	0	35	United-States
32	Private	186824	HS-grad	9	Never-married	Machine-op-inspct	Unmarried	White	Male	0	0	40	United-States
38	Private	28887	11th	7	Married-civ-spouse	Sales	Husband	White	Male	0	0	50	United-States
43	Self-emp-not-inc	292175	Masters	14	Divorced	Exec-managerial	Unmarried	White	Female	0	0	45	United-States
40	Private	193524	Doctorate	16	Married-civ-spouse	Prof-specialty	Husband	White	Male	0	0	60	United-States
54	Private	302146	HS-grad	9	Separated	Other-service	Unmarried	Black	Female	0	0	20	United-States
35	Federal-gov	76845	9th	5	Married-civ-spouse	Farming-fishing	Husband	Black	Male	0	0	40	United-States
43	Private	117037	11th	7	Married-civ-spouse	Transport-moving	Husband	White	Male	0	2042	40	United-States
59	Private	109015	HS-grad	9	Divorced	Tech-support	Unmarried	White	Female	0	0	40	United-States

Buyer's problem

1. How useful is a dataset for me?
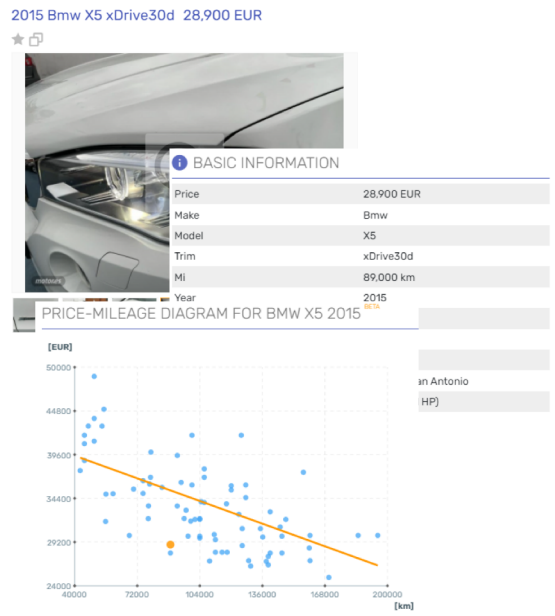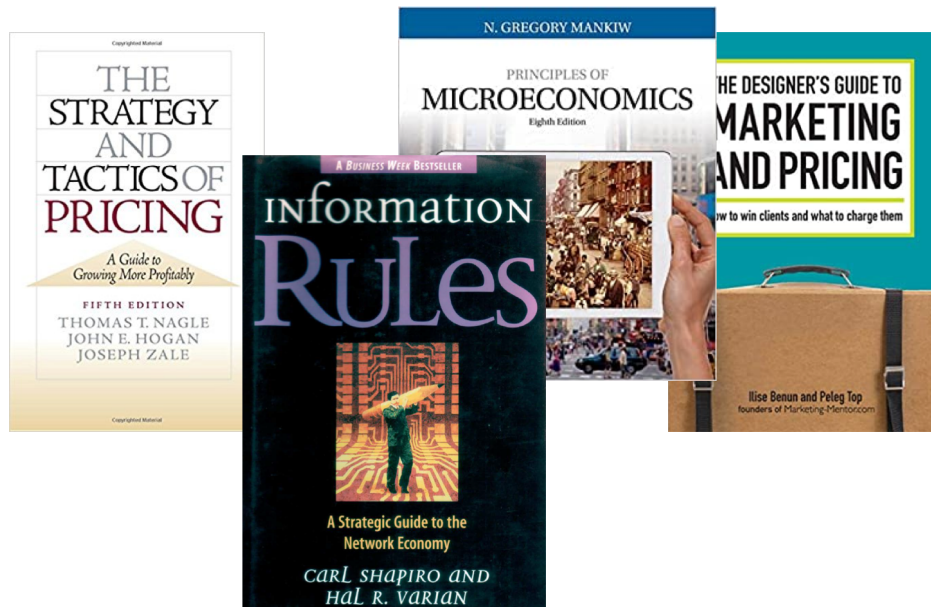
2. How does its value change when combined?

Seller's problem

"Tech changes, economic laws do not" (Shapiro & Varian 98)...

... and pricing data brings additional problems

1. Value strongly depends on the buyer
2. Data maybe be easily replicated
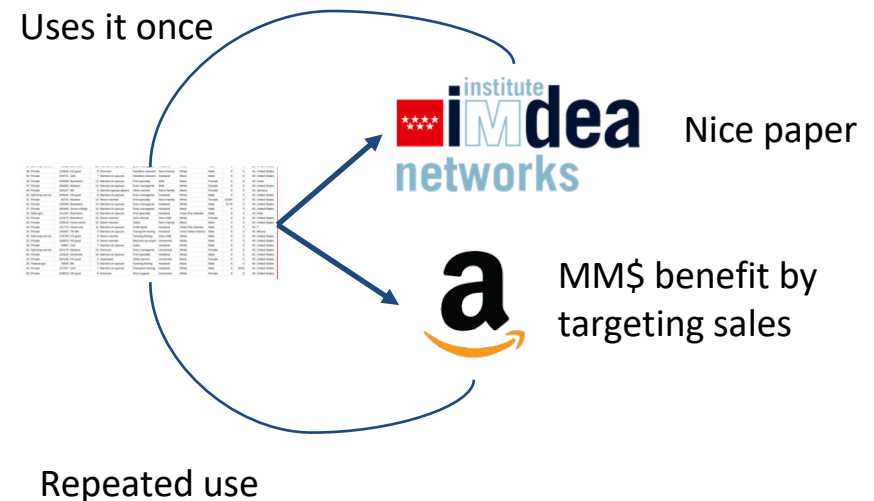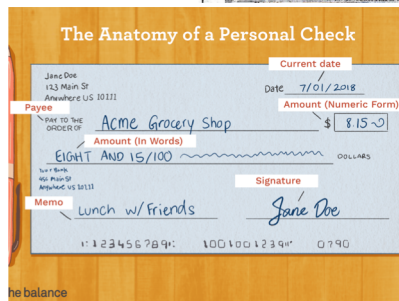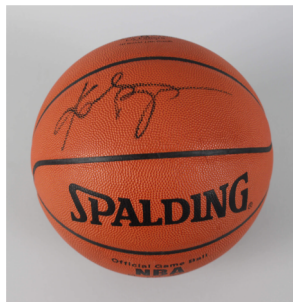3. Different Buyers ... different intensity of use

Uses it once

Nice paper

MM$ benefit by targeting sales

Repeated use

Market study   Psychology

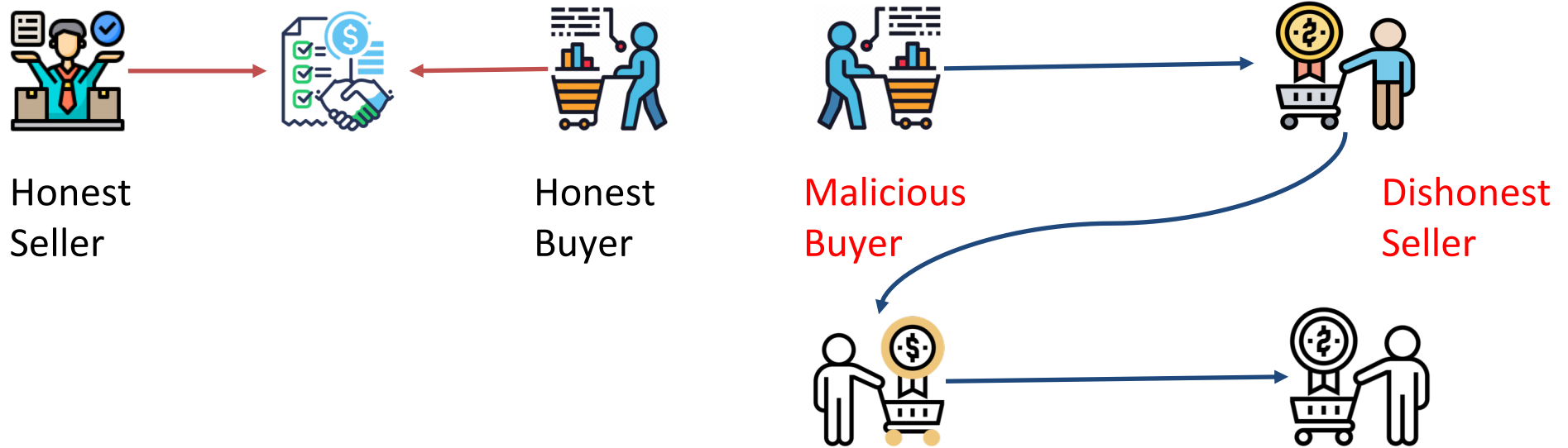Price-elasticity   Value-based pricing

Competition-level   Dynamic pricing

Physical ownership
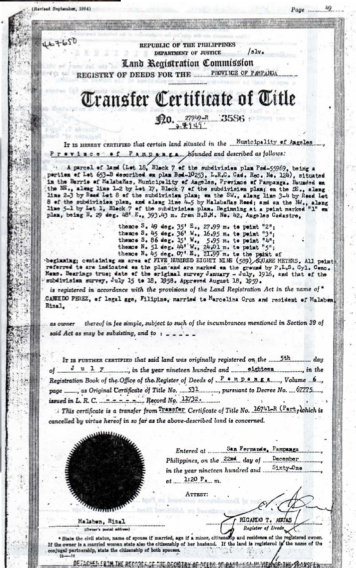
Digital ownership

Dataset ownership

Honest Seller

Honest Buyer
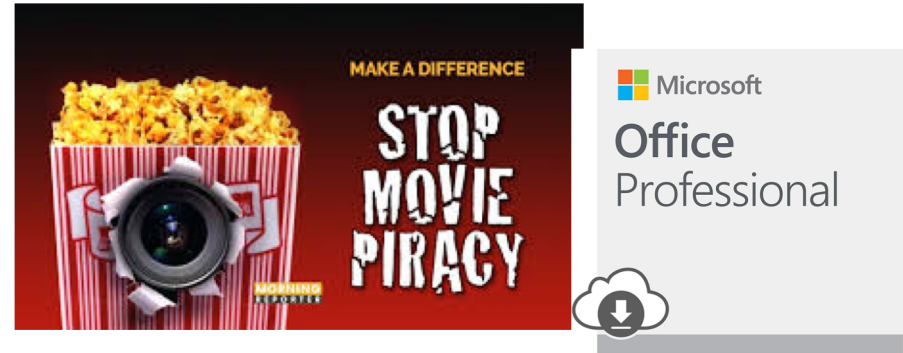
Malicious Buyer

Dishonest Seller

- The Malicious Buyer distributes the data of the Honest Seller without her consent.

- Can re-appear as a Dishonest Seller (or pass it to somebody else for this purpose) and act like an Honest Seller.

- **How can the Honest Seller prove his original ownership of the data?**

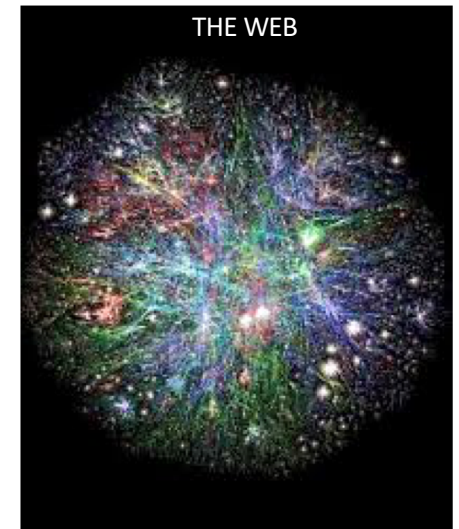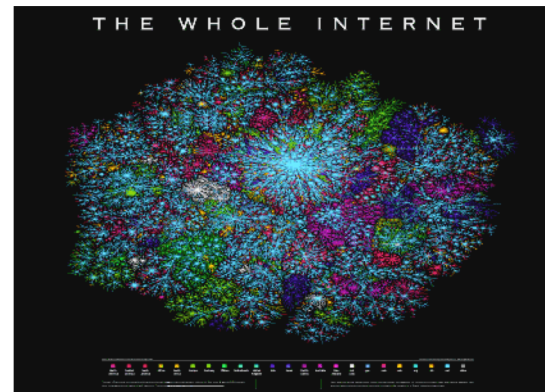- **How can the Honest Seller discover who the Malicious buyer was?**

Data Marketplace design
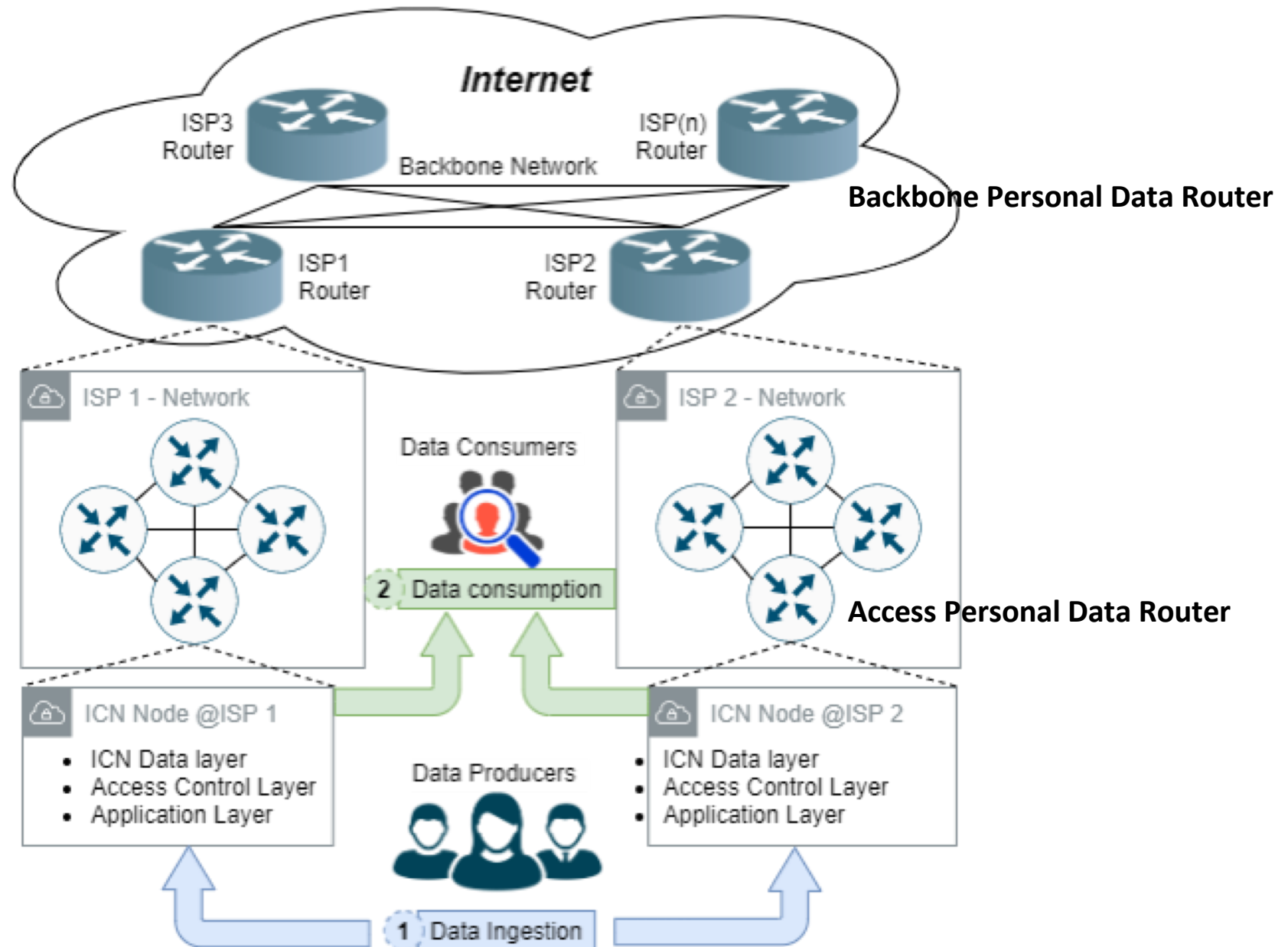
Existing approaches

What we seek instead

THE WHOLE INTERNET

THE WEB
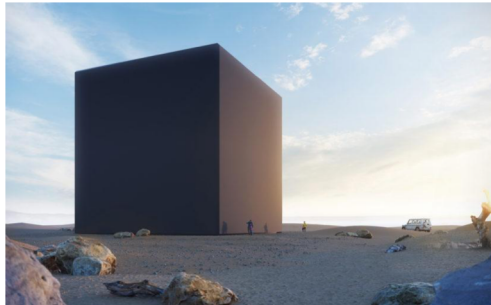
- Open
- Distributed
- Democratic
- Easy to bootstrap

... a standard?

A distributed Data Inter-Network

Thank you!