



UNIVERSITEIT VAN AMSTERDAM

AIRFRANCE KLM

EXPLORING DIGITAL DATA MARKETPLACES

**Researching data sharing principles in aviation maintenance context
An outline**

**5G meeting
15-6-2018 - Schiphol**

**Dr. ing. Leon Gommans
Science Officer / Guest Researcher
IT Strategy & Technology Office - R&D / University of Amsterdam - Systems & Network Engineering Lab**

EXAMPLES OF DATA SHARING RELEVANT TO OUR INDUSTRY

Improve **passenger experience** at airports



Improve **efficiencies** across multi modal logistic chains



Increase **fleet availability** by improving maintenance scheduling by estimating maintenance credits from aircraft data.



Research efforts also consider use-cases in Healthcare, Agriculture, Smart Cities, Public Safety, Cybersecurity, ..

RESEARCH QUESTION

RECOGNIZING DATA IS AN ECONOMIC ASSET THAT CAN BE TRADED



Given a common benefit:



How can data be shared amongst *data suppliers* and *data consumers* in a 1) **FAIR** and **ECONOMIC** way, whilst providing adequate 2) means to **REDUCE RISK**?

PROBLEM WITH MARKET DEVELOPMENT

1) FAIR AND ECONOMIC WAY: MONOPOLISM VS OPEN MARKET DEVELOPMENT

As in seen in the beginning of the oil industry: control of the transport platform enabled monopolism. Open marketplace mechanisms will enable trade, innovation and fair competition

Oil Economy	Concept	Data Economy
Crude Oil	Resource	Raw Data
Land / well owner	Ownership	Operator of data generator ?
Oil price	Value	Data price ?
Barrel, rail, pipeline, tanker ..	Transport	Future Internet ?
  Oil market	Trade	Data Market ?
Petrochemical industry	Value Creation	Data science algorithms
Fuel, lubricants, plastics, detergents,..	Products	Efficiency, predictions, planning, recognition, behavior,..



A red arrow points from the airplane icon to the 'Raw Data' cell, and another red arrow points from the database icon to the 'Data Market ?' cell. A blue arrow points from the 'Oil market' cell to the 'Oil Economy' column.

DIGITAL DATA MARKETPLACE CONCEPTS

AREA CONSIDERED BY OUR RESEARCH EFFORT

Concept	Data Economy
Resource	Raw Data
Ownership	Operator of data generator ?
Value	Data price ?
Transport	Future Internet ?
Trade	Data Market ?
Value Creation	Data science algorithms
Products	Efficiency, predictions, planning, recognition, behavior,..

FLAGSHIP RESEARCH EFFORT

Amsterdam Economic Board and University of Amsterdam coordinate a multi-disciplinary research effort, involving multiple disciplines:

**Law,
Computer Science,
Business School,
Economics,
Social Sciences**

Amsterdam houses one of the largest Internet Exchanges (AMS-IX):

Can it house a Data Exchange that facilitates Data Marketplaces (AMS-DX)?

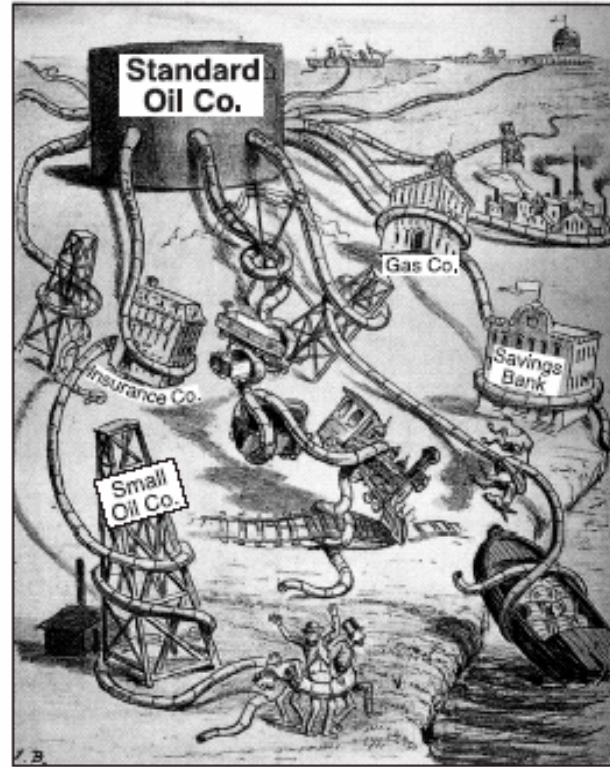
CONSEQUENCES OF MAINTAINING A MONOPOLY

SOCIETY WILL OBJECT DISPROPORTIONATE VALUE CREATION AND ENTANGLEMENT

Standard Oil got named *The Octopus*, with many of its tentacles in society.

US government created antitrust law *to protect the public from the failure of the market where unfair conduct tends to destroy competition itself.*

(Sherman Act - 1890)



Source: Herman Viola, *Why We Remember: United States History*, Scott Foresman—Addison Wesley Publishing Co. (adapted)

MANAGING RISK AT DATA MARKETPLACE

2) MEANS TO REDUCE RISK: REQUIRES STEPS AT DIFFERENT LEVELS



COMMON BENEFIT

Define and agree common benefit no single organization can achieve on its own.



GROUP RULES

Define consortium rules considering data use, access and benefit sharing



ORGANIZE TRUST

Organize power and trust **as a means to reduce risk** for participating members

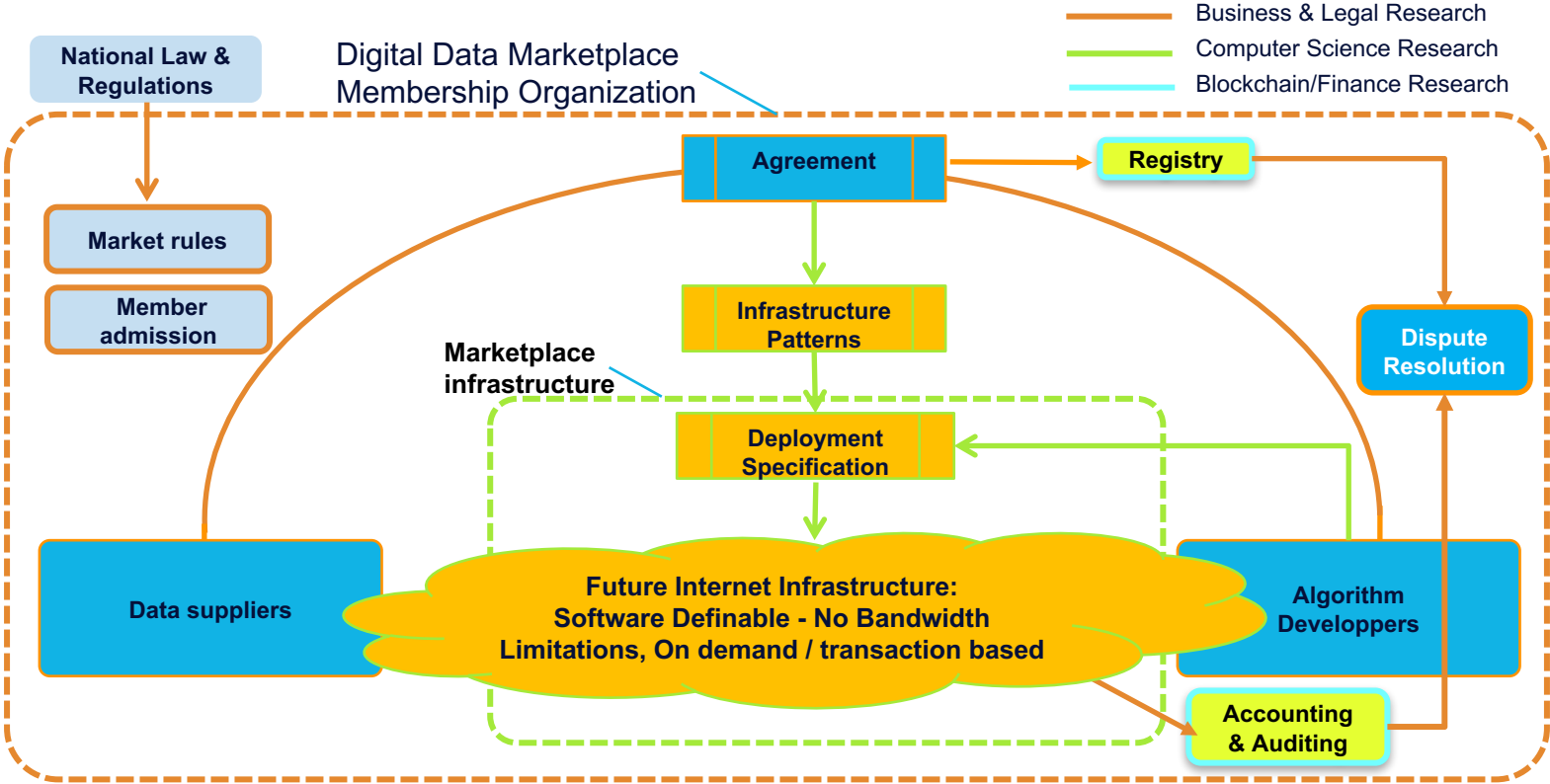


IMPLEMENT INFRASTRUCTURE

Research operationalization of **Digital Data Marketplace & Data Exchange** concepts

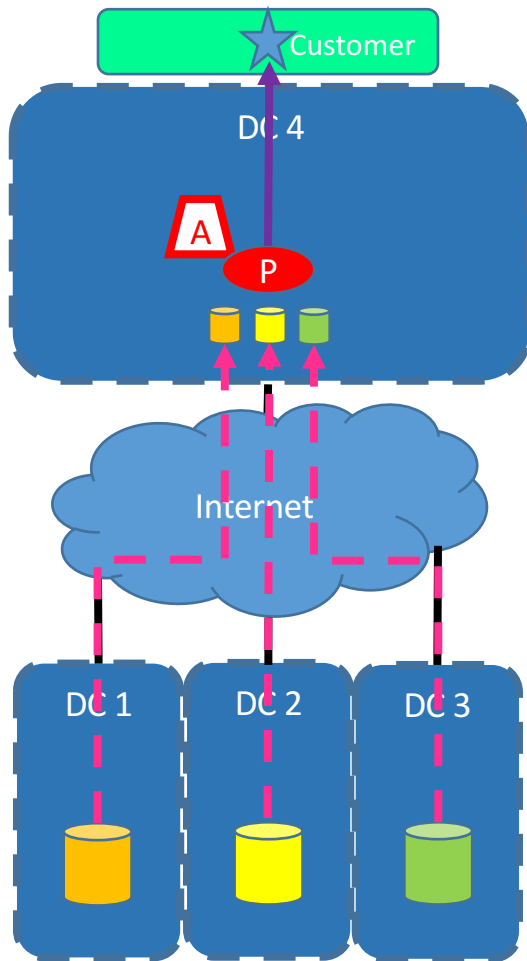
DIGITAL DATA MARKETPLACE ARCHITECTURE

ENABLING COMPETITIVE ALGORITHM DEVELOPMENT



INFRASTRUCTURE PATTERN RESEARCH

Traditional Model
(raising data owner concerns)



- Processing
- Algorithm
- Result
- Dataset
- Contract
- Filetransfer
- Result output
- Algorithm copy
- Remote filesystem mount
- Container
- Contract Driven Slice

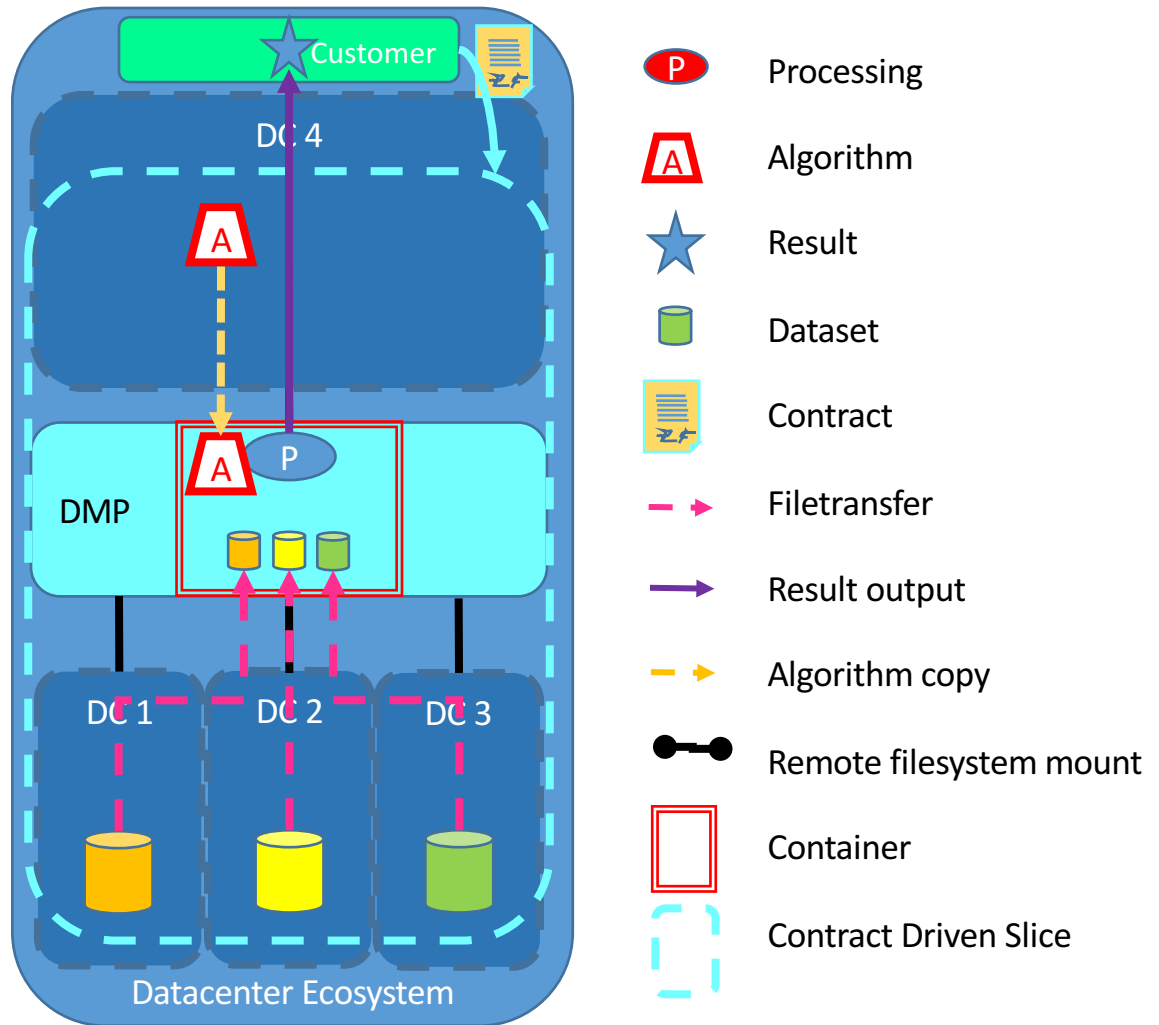
INFRASTRUCTURE PATTERN RESEARCH:

One of several examples

Digital Marketplace (DMP)

infrastructure supports creation of (temporary) slice across data centers, implementing a data science workflow based on a contract between customer and suppliers of data and algorithm.

Generic Infrastructure is supported by a **Data Exchange**



CONCLUSION

A DIGITAL MARKET PLACE:

- **Is created and governed by an industry membership organization as a means to reduce risk.**
- **Serves a common benefit no single organization can achieve on its own.**
- **Connects data suppliers and algorithm developers via a software definable, membership organization owned, infrastructure.**
- **Arranges processing as an on-demand infrastructure transactions, where the infrastructure is guaranteed to be cleaned up after execution.**
- **Infrastructure itself is delivered by neutral Data Exchanges across the world, in the same way neutral Internet Exchanges interconnect Internet Service Providers.**

THANK YOU



UNIVERSITEIT VAN AMSTERDAM



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769288

