data beacon

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TADOREA
KNOWLEDGE DISCOVERY FOR AVIATION

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Data platforms

A requirement for the modern AI methods

Data is the new oil

You are already paying with (personal) data

Producing data does not mean you can capture or store it

Sitting on tons of data would not give you any value

Data needs to be extracted, transformed, loaded, analysed

The one generating data rarely has those skills

There are **two** alternatives

Create your **own** Data Science team:

- Higher investment, risk
- Added complexity
- **It is not necessarily going to be a better team**

Contract a specialized **3rd party**:

- Need to handle contracts
- Limited control over results
- **Data leaves the company, it requires trust**

or a **mix**, which has **the best and the worst** of both possibilities

Anyway, this solves the problem, or doesn't it?

Modern AI methods demand Big Data

https://xkcd.com/1838/

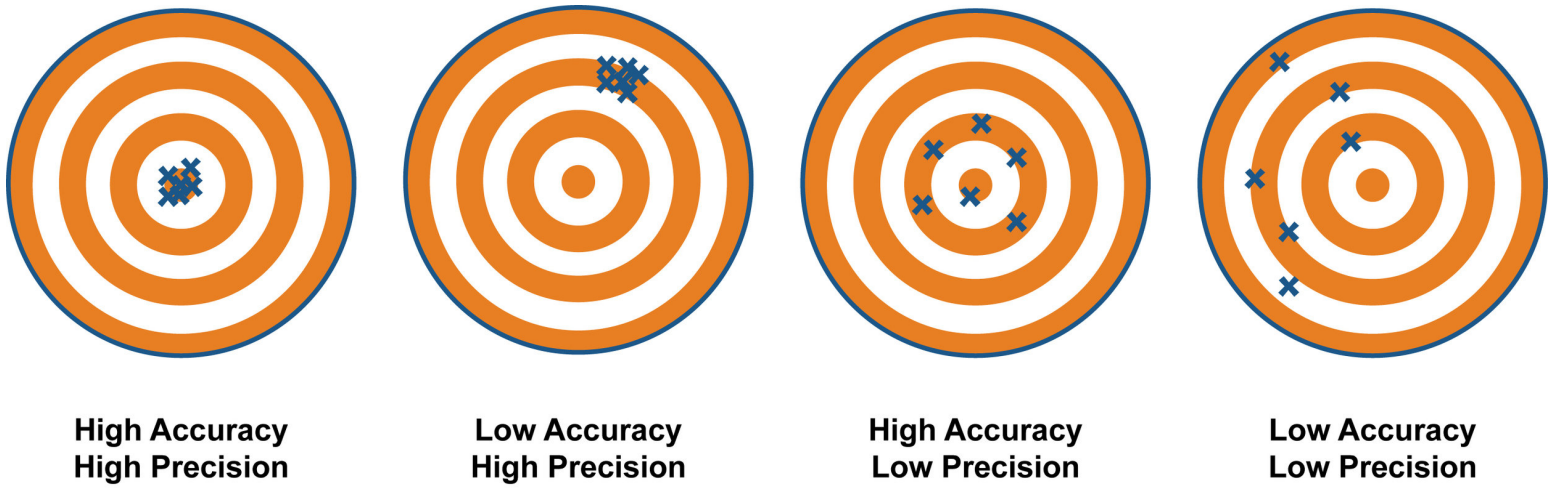
The B in Big Data

* Value and veracity are also considered as part of Big Data but not as widely accepted as volume, variety and velocity

The B in Big Data

Volume, Variety and Velocity

Modern AI models devour data they require to be feed by **huge amounts** of it

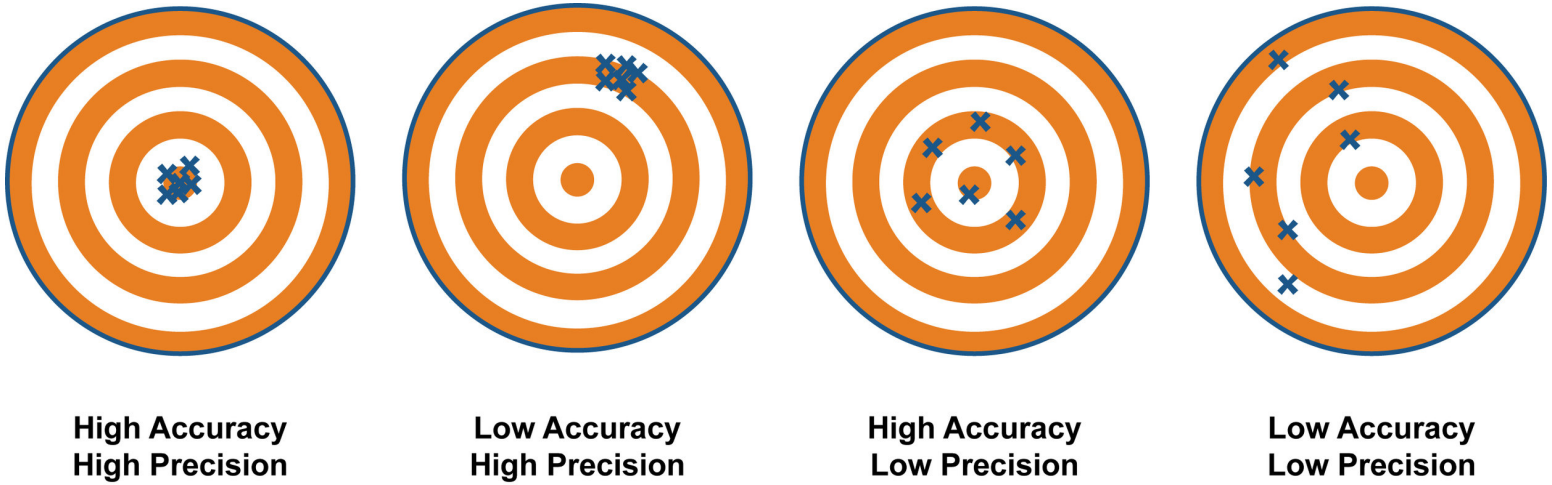


In general high Volume increases **precision**

The B in Big Data

Volume, **Variety** and Velocity

For modern AI-models it is not enough to have a huge amount of data, it also needs to be **representative** of the phenomenon under study

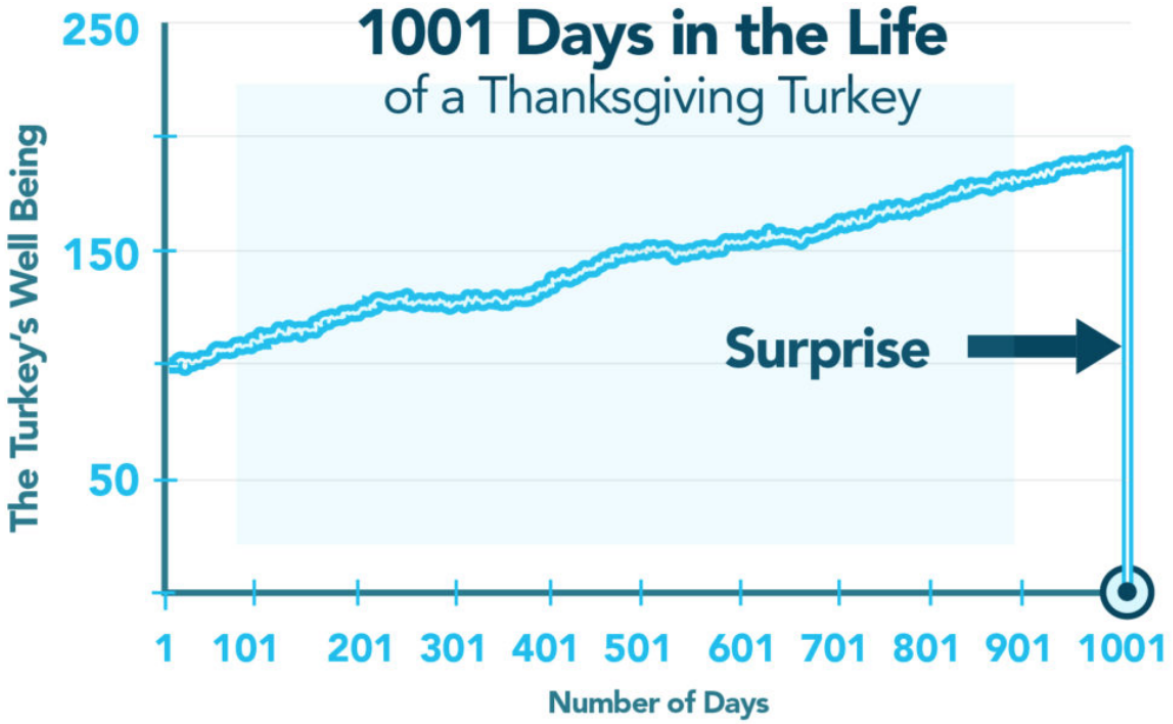


In general variety increases **accuracy**

The B in Big Data

Volume, Variety and **Velocity**

Most socio technical systems are not **stationary**, therefore AI-models need to be continuously re-evaluated with new data

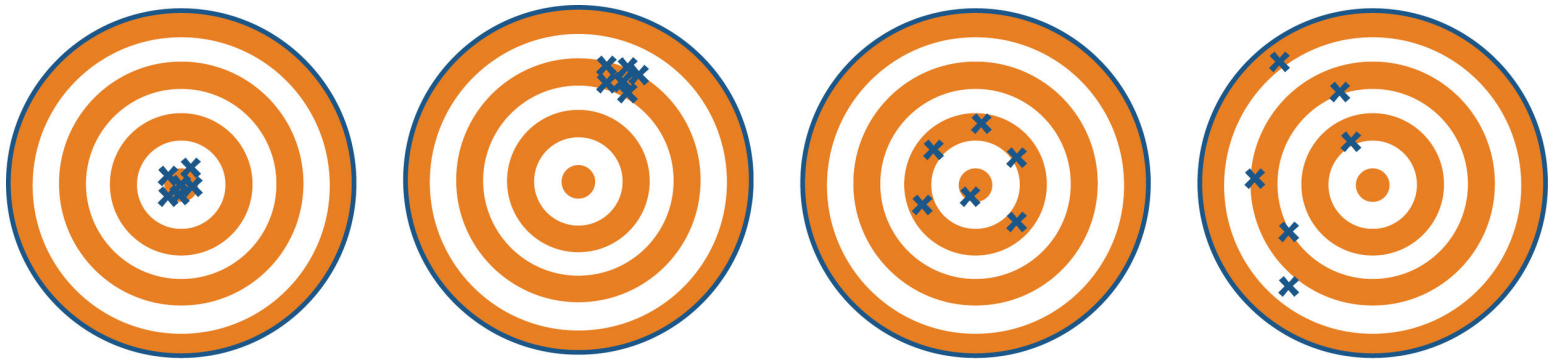


The B in Big Data

Volume, Variety and Velocity

Without the three components it is very unlikely to develop and deploy modern AI applications

volume - precision, variety - accuracy



Variety is impossible in isolation

Volume and velocity can be reached in **isolation** by a data producer, but variety...

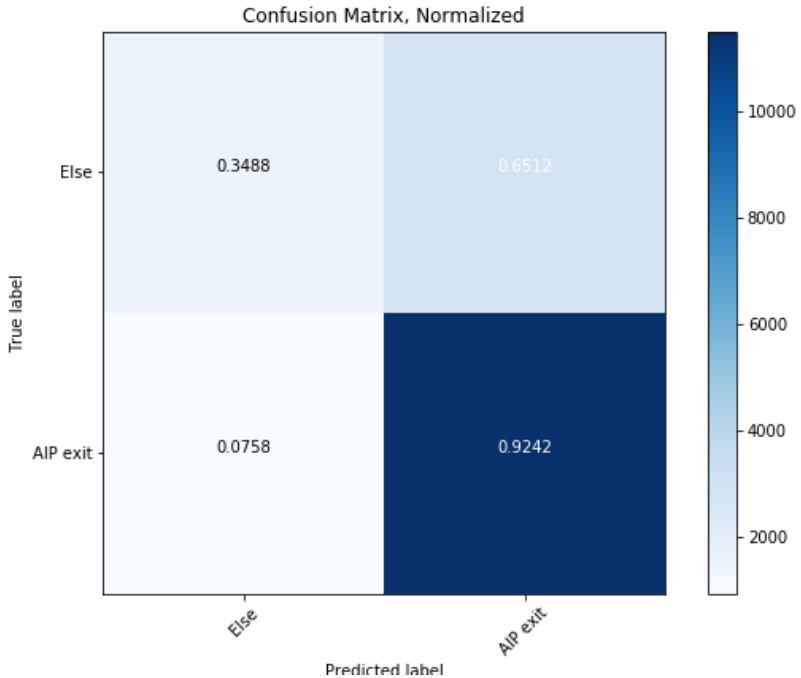
Variety is key

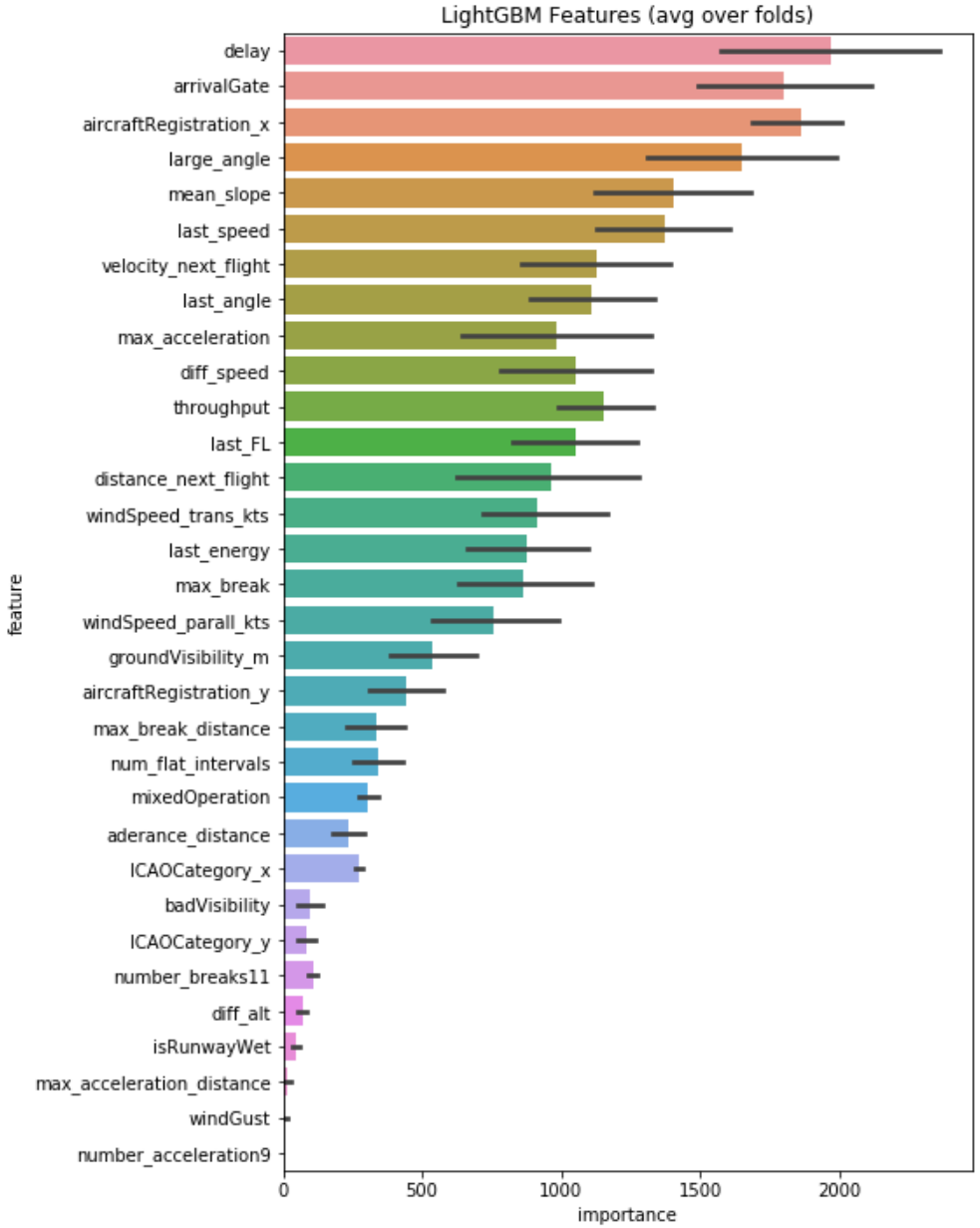
Variety is key for learning, imagine learning what a cat look like with this information:

it is simply **impossible**, no matter how many pictures or how recent they are

Runway exit prediction

Feature importance when the prediction is performed at 2NM from threshold and Normalised Confusion matrix of the classification.





Conclusion

Variety is as important as volume if not more

AI applications should not be developed in isolation

Data platforms are a necessity for AI applications

Are data platforms enough?

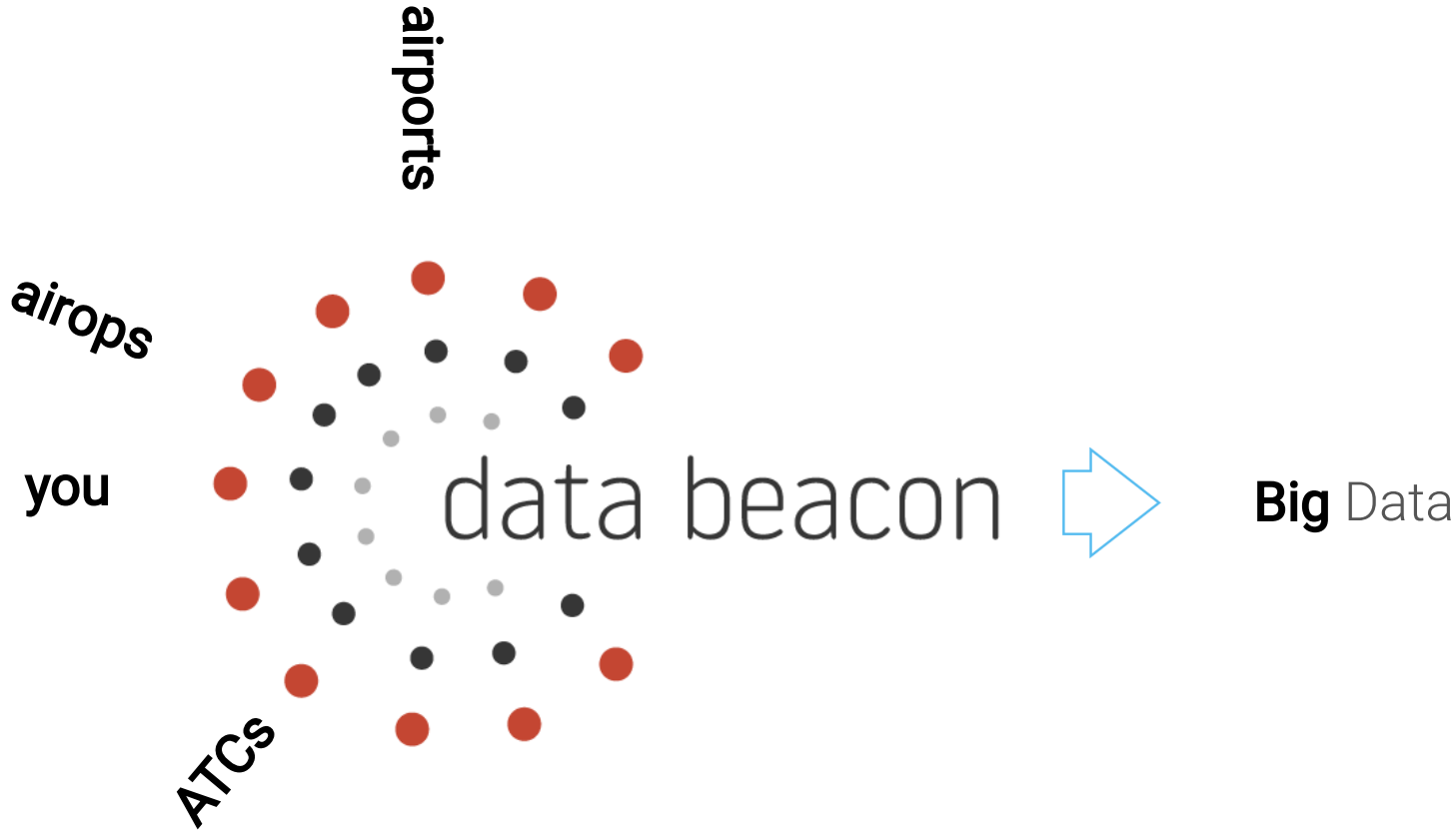
DataBeacon

Beyond the data platform, the open AI platform

What is DataBeacon?

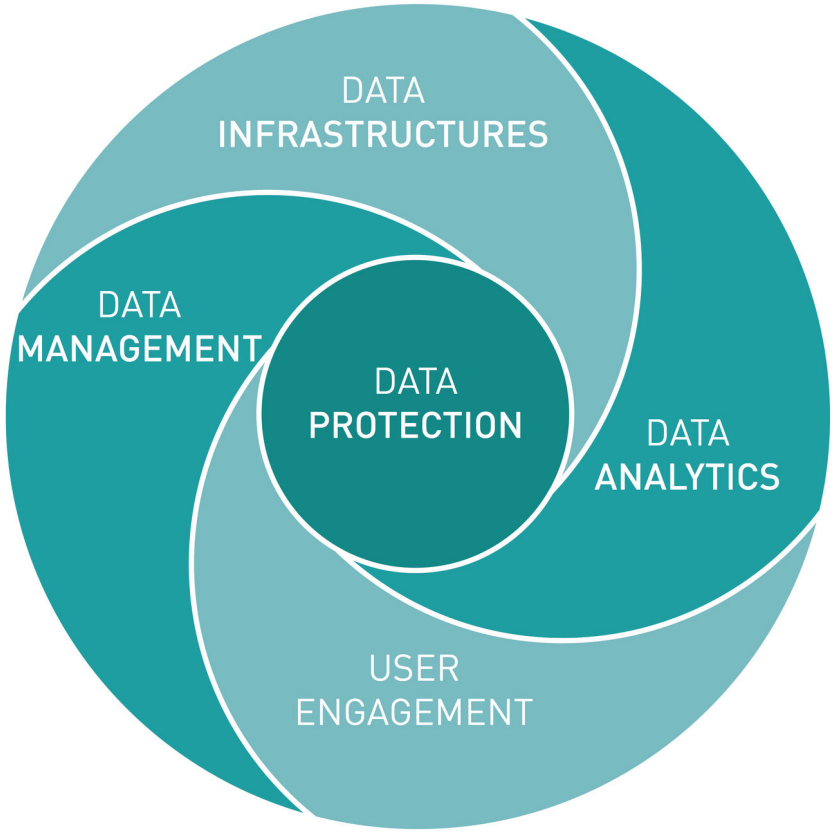
DataBeacon is not just a data platform but an **open AI platform for aviation**

DataBeacon leverages your data to create big data



in this sense it is a data platform

DataBeacon two-sided data protection



By using a proprietary cryptographic solution **Secure Data Fusion** (SDF) DataBeacon merges your data with others securely and privately, but still useful for building AI applications.

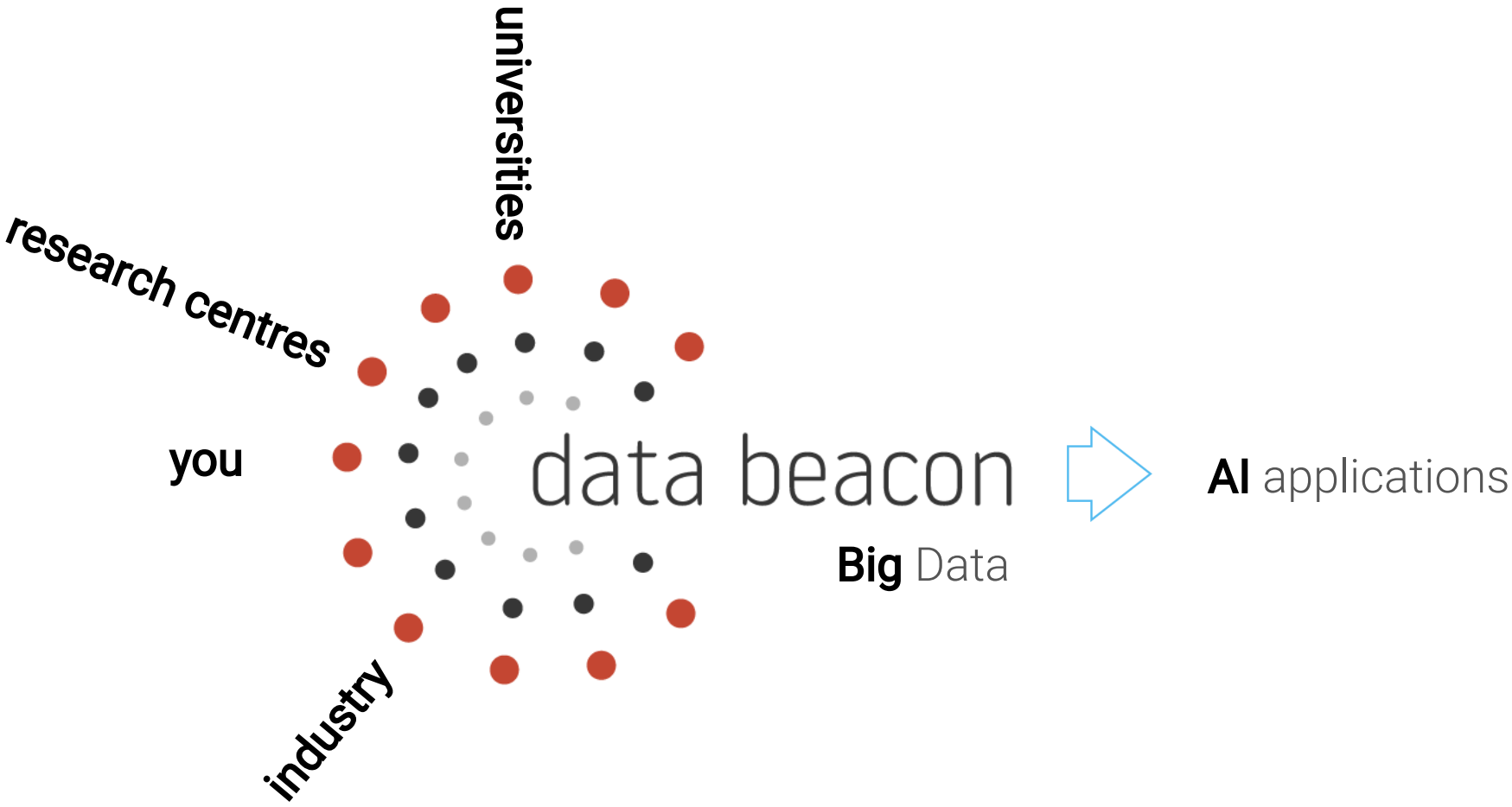
A global **Data Protection Governance** model extends the technological solution by a series of Data Protection Agreements (DPAs) and Annexes.

Your data is protected twice!

But, just sitting on (big) data won't give much insight

DataBeacon is not just a data platform

(Teams of) Data Scientists can join DataBeacon as well and develop AI applications **within the platform**



DataBeacon an open-AI platform

DataBeacon offers a **full-stack solution** for Data Scientists, not just data

Data clean and ready to be consumed in a **Secure Data Frame** format

Under a global **data protection governance** model

Securely private **sandbox environments** to analyse the data

Data is never distributed, stays always in the cloud

DataBeacon an open-AI platform

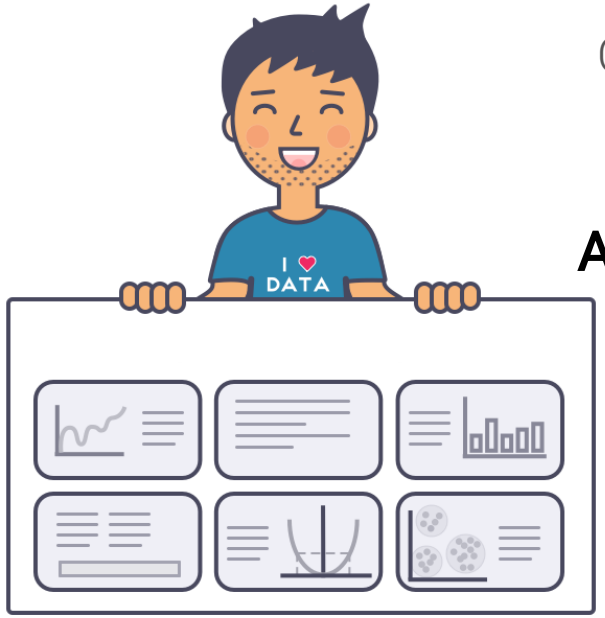
DataBeacon offers a **full-stack solution** for Data Scientists, not just data

On demand cloud-based scalable **clusters** to cope with demanding AI models

Full **development environments** with customizable data science toolsets

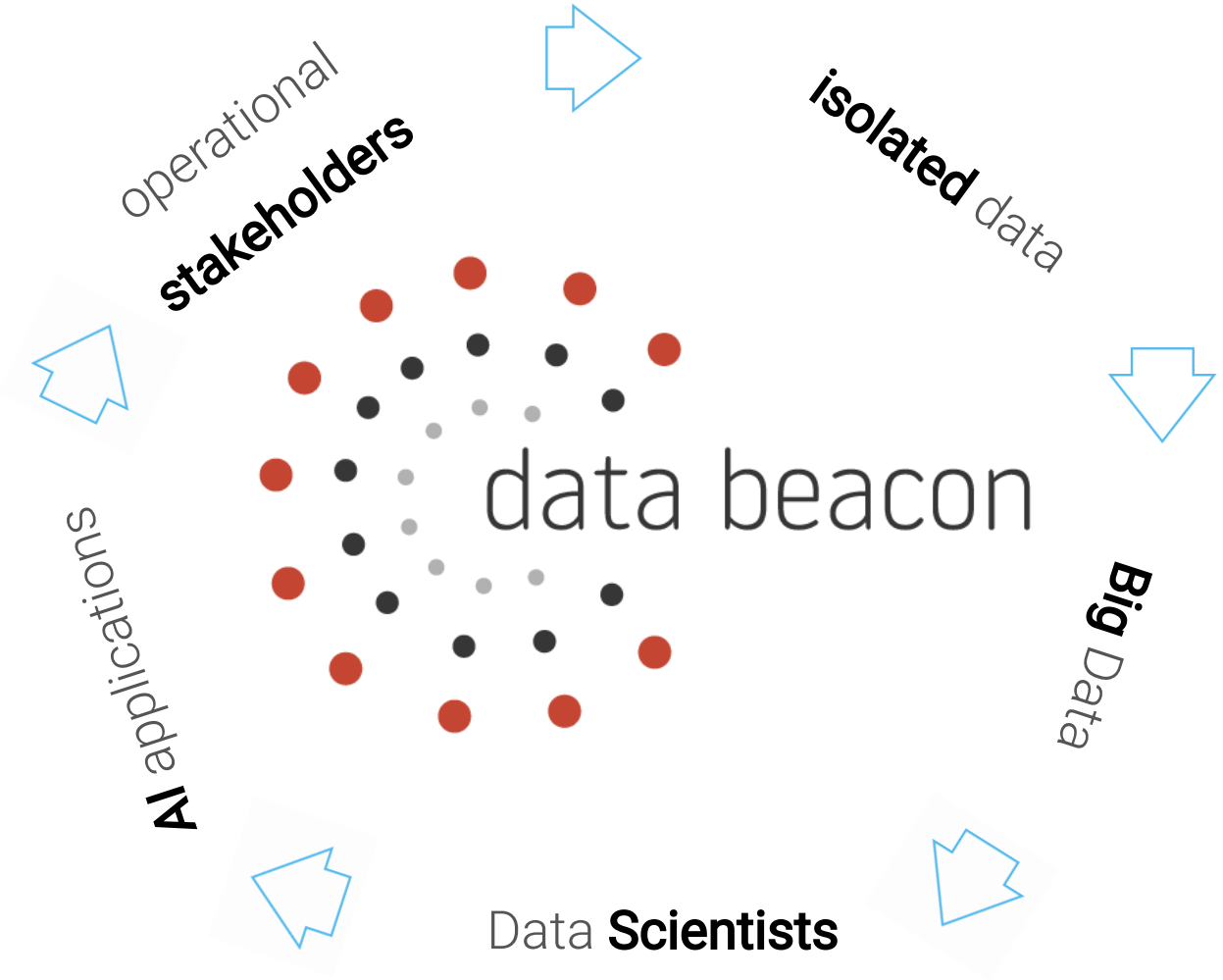
Collaborative work based on Git and agile scrum

Communication of results through **interactive dashboards**



Accessed anywhere just from a (secure) web-browser

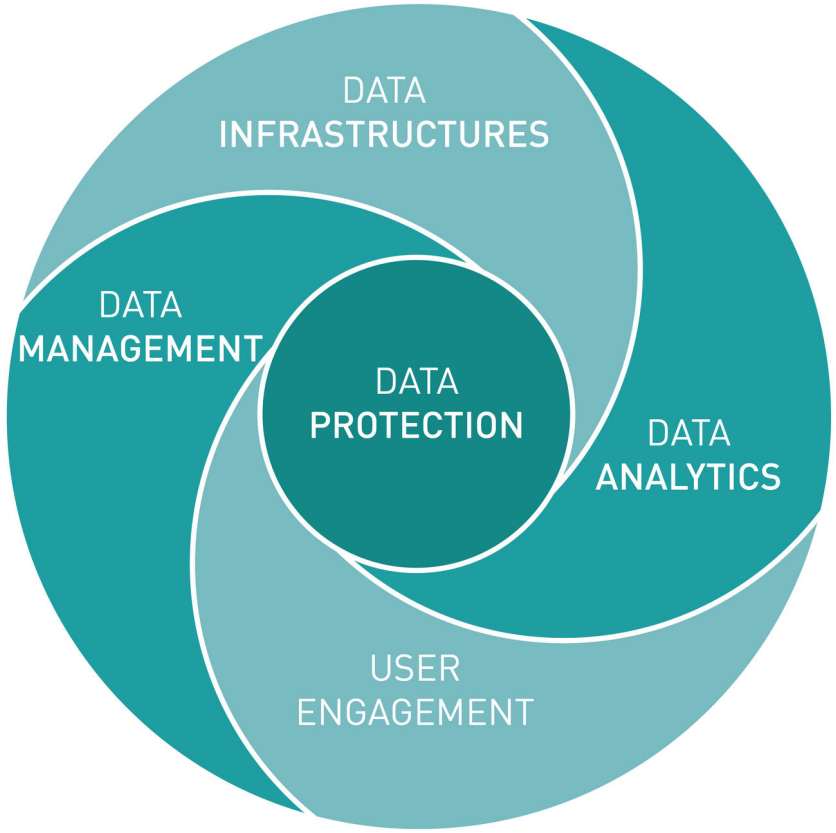
The DataBeacon open AI platform for aviation



The architecture

How is DataBeacon built?

DataBeacon sits in the middle between stakeholders and analysts



Privacy by design

Data engineering - Security, Scalability, Availability

Integrated **technology** platform & **governance** model

Designed for AI applications

Secure Data Fusion

sandboxed environments

AI is a collaborative effort

Who **builds** a data platform?

Infrastructure engineers - design & deploy a cloud infrastructure

Operational stakeholders - bring data, design/decide use cases

Domain experts - collaborate with data scientists

Technology partners - data management, infrastructure

AI is a collaborative effort

Who **operates** a data platform?

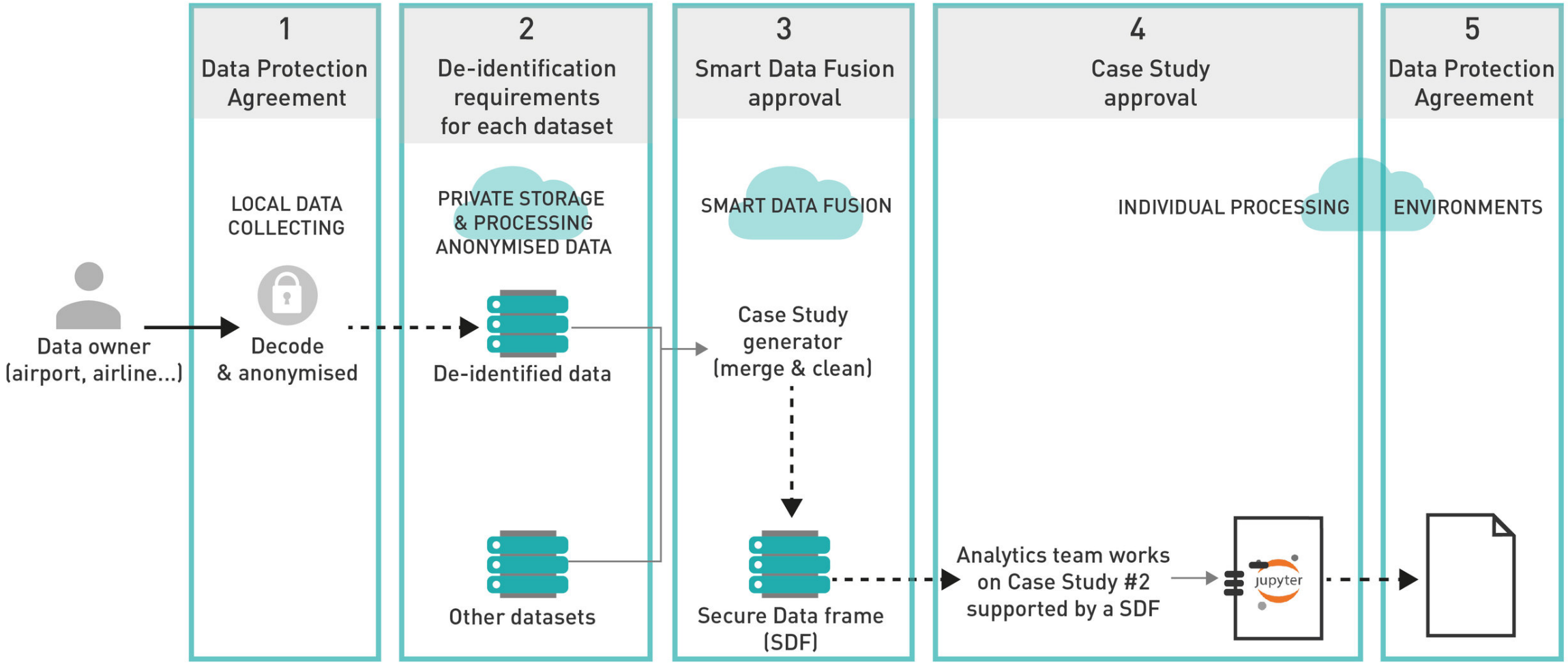
Data Scientists - research, new analytic concepts

Data quality engineers - explore, prepare, validate data

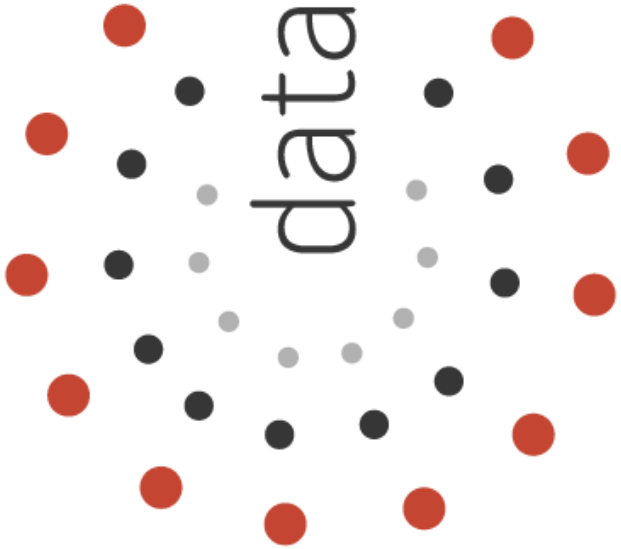
Data analysts - prepare reports, dashboards

Software engineers - develop, optimize and deploy

Integrated technology platform & governance model



Software Stack



data beacon

jupyter

+ableau

Atlassian Confluence

JIRA Agile

Spark

Parquet

Let's Encrypt

APACHE kafka
A distributed streaming platform

Apache Zookeeper

BeeGFS®

amazon web services

DataBeacon today

Tested as the (**closed**) AI platform for the Safeclouds.eu project

10 data providers/operational users

5 technology partners

Infrastructure ready to be used

Governance model streamlined

Collaborative AI environment ready

SafeClouds.eu

*as of October 2018

DataBeacon tomorrow

Airprox

Separation with terrain

SafeRunway

Level bust

Hard landing

Wake vortex separation

Congestion monitoring

Unstable approach

Collaborative AI-app market for aviation

Thank you!

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TADOREA
KNOWLEDGE DISCOVERY FOR AVIATION

What is DataBeacon?

DataBeacon is the open-AI platform for aviation

Why do I need to join?

Because AI isolated efforts have a limited chance of success.

If you are a **stakeholder**, you need to join DataBeacon to break the isolation:
- make your data really big, by adding variety to it
- reach out a community of **analysts** and **AI-developers**

if you are **analysts** and **AI-developers**, you are smart I will let you figure it out

Conclussions

Data Platforms - not longer an option but a **necessity** to carry ML/AI work

Focus on **high impact case studies** to keep up the momentum

Start with **existing data** and involve more stakeholders to expand

Deploy analytics to solve **real problems** engaging with operations

Embrace **agile methodology** through a product owner

Democratize data with the help of **strong data protection**

Data Platforms are a **gargantuan** tasks - Leverage on DataBeacon

Our focus

Secure and **streamlined** data analytics process

A **data protection** agreement that brings confidentiality and privacy

De-sensitised / de-identification **secure fusion of data**

Verifiable restricted **access** to known partners

Clear, agreed and **auditable** use of the data

Cost and time efficient AI/ML projects - solving the "cold start" problem

Collaborative, "open", and secure environment