



# Big data and its application in shipping

Nautischer Verein Brunsbüttel e.V.

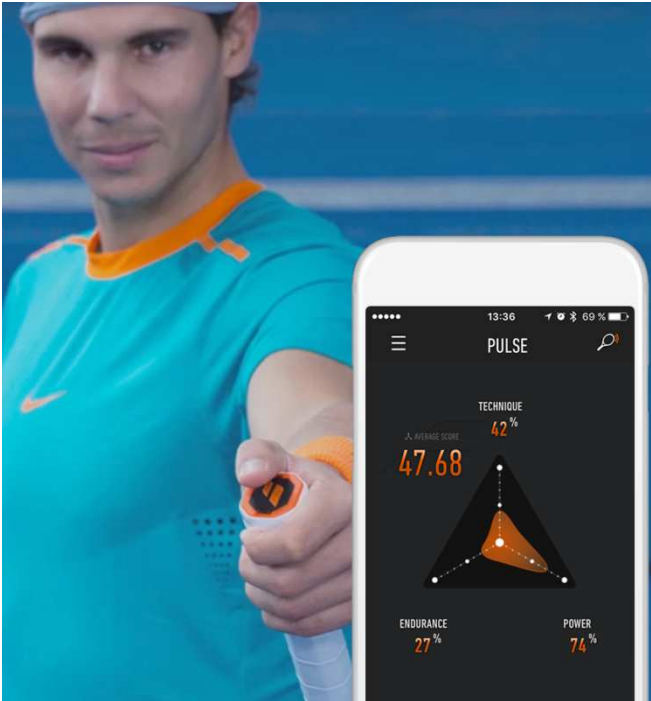
Till F. Braun, Consultant Performance Solutions

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# This is not a normal banner ad – but a tracking of my user behavior in www

The screenshot shows a web interface for an email inbox. At the top right, there is a blue header with a power icon and the text "Logout". Below the header, the inbox area contains a large envelope icon with the number "0" inside, and the text "Klicken Sie auf eine E-Mail." below it. To the right of the inbox is a sidebar with two flight advertisements. The first advertisement is for "Flug Hamburg - Düsseldorf - One-Way" with a price of "ab 49 €" and a "Buchung" button. The second advertisement is for "Flug Stuttgart - Mallorca - One-Way" with a price of "ab 59 €" and a "Buchung" button. At the bottom of the sidebar is the "airberlin" logo.

# This is not a normal tennis racket – but an example of IoT (Internet of Things)



## What is Big Data and where does it come from?

“Moore's law  
turning 50”\*

“The rediscovery of the log  
file”  
(user behaviour in www)

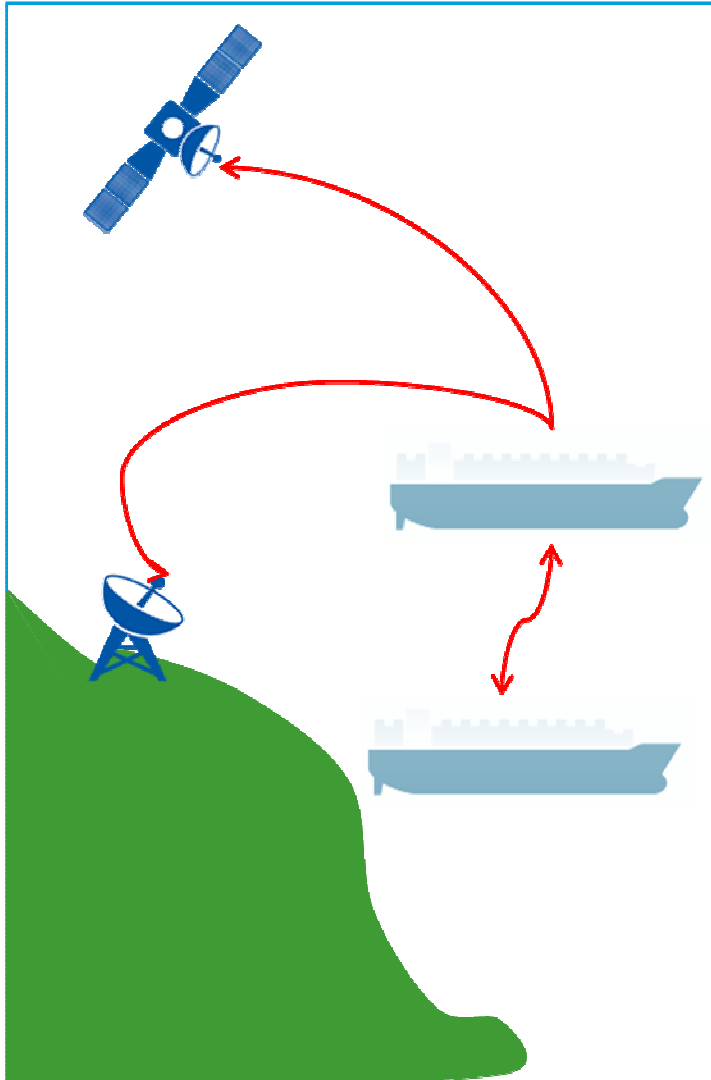
“Internet of things”  
(smart products, sensors)

“Connectivity”

- **Volume (Umfang):** Grösse der Datensätze wächst Schnell und stellt neue Anforderungen an Archivierung und Analyse
- **Velocity (Geschwindigkeit):** Daten werden schneller erzeugt und müssen oft in Echtzeit analysiert werden
- **Variety (Vielfalt):** Daten können jeder Art und Struktur sein; das ist eine Herausforderung für Datenintegration
- **Veracity (Wahrhaftigkeit):** Die Qualität von Daten ist unsicher. Vertrauen in Daten ist ein wichtiger Aspekt

\* Das mooresche Gesetz besagt, dass sich die Komplexität integrierter Schaltkreise mit minimalen Komponentenkosten regelmäßig verdoppelt; je nach Quelle werden 12 bis 24 Monate als Zeitraum genannt

## Example: AIS data – the “log file” of a ship



- **Free & unencrypted VHF signal** transmitted by every vessel >300 GT containing, e.g.
  - Vessel MMSI/IMO & name
  - Vessel position
  - Speed
  - Draft
  - Vessel dimensions
- **Signal can be received by any organisation or person** operating **land based stations** (~30 nm shore coverage, seconds to few minutes updates) and **satellites** (global coverage, minutes to few hours updates), or vessels themselves
- Original use for safety and traffic control near shore
- Data is **offered by many commercial providers** in different qualities

**Complete picture of the entire world fleet at almost any point in time**

## Example: Satellite weather is available across all oceans



- Satellite weather records in 6h intervals
- Covering all oceans with e.g. wind force information on 0.25° grid

## Example: Fuel sampling data of 50% of the sampling world fleet



S[%]

H<sub>2</sub>O[%]

Visc.[cSt]

S[kg/m<sup>3</sup>]

NCV  
[MJ/kg]

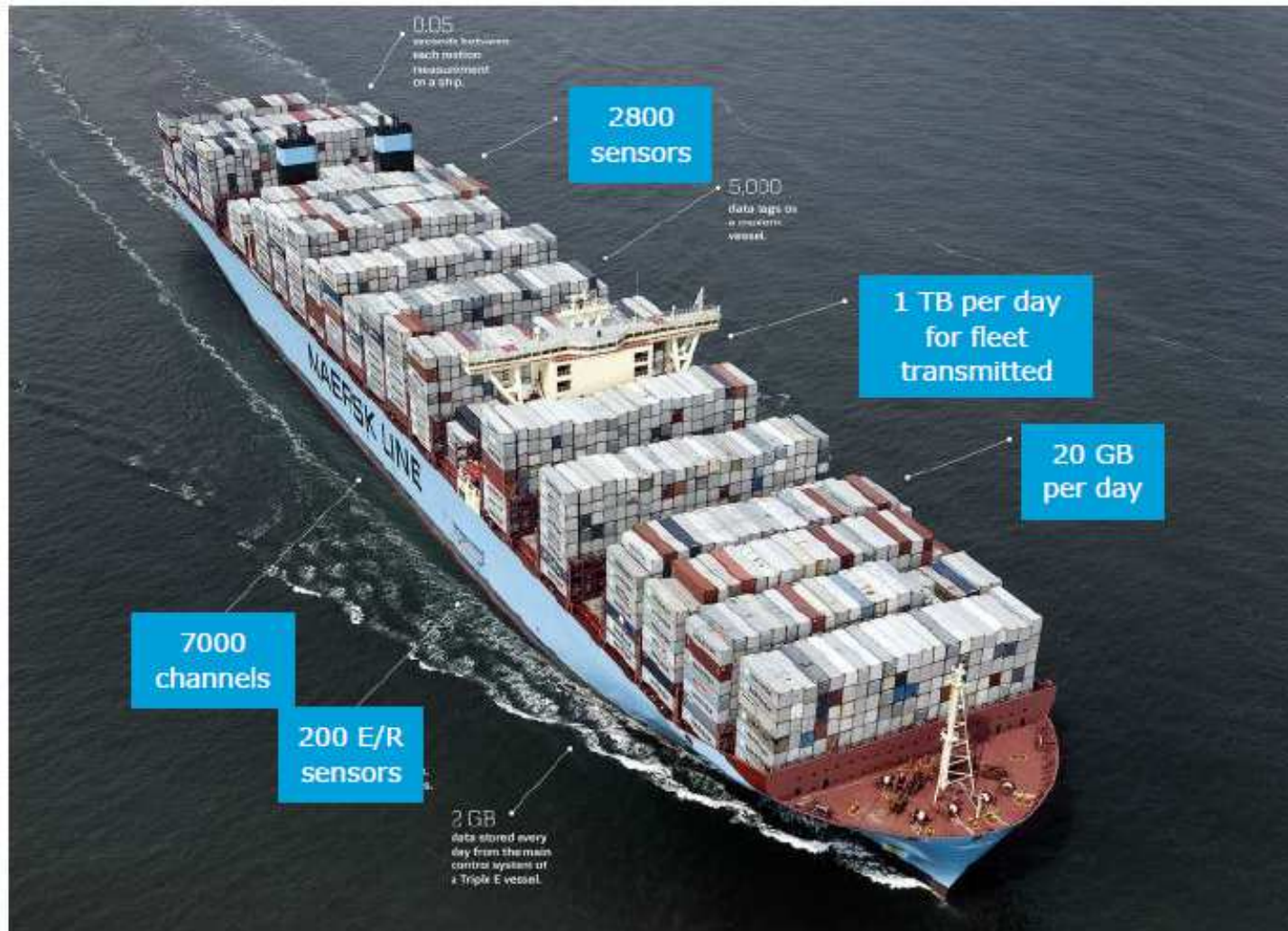
GCV  
[MJ/kg]

Fuel is compliant  
with BDN/BDR

...

- All sampling results of 50% of fleet doing regular sampling (~10.000 vessels)
- With port, supplier and fuel quality benchmarks

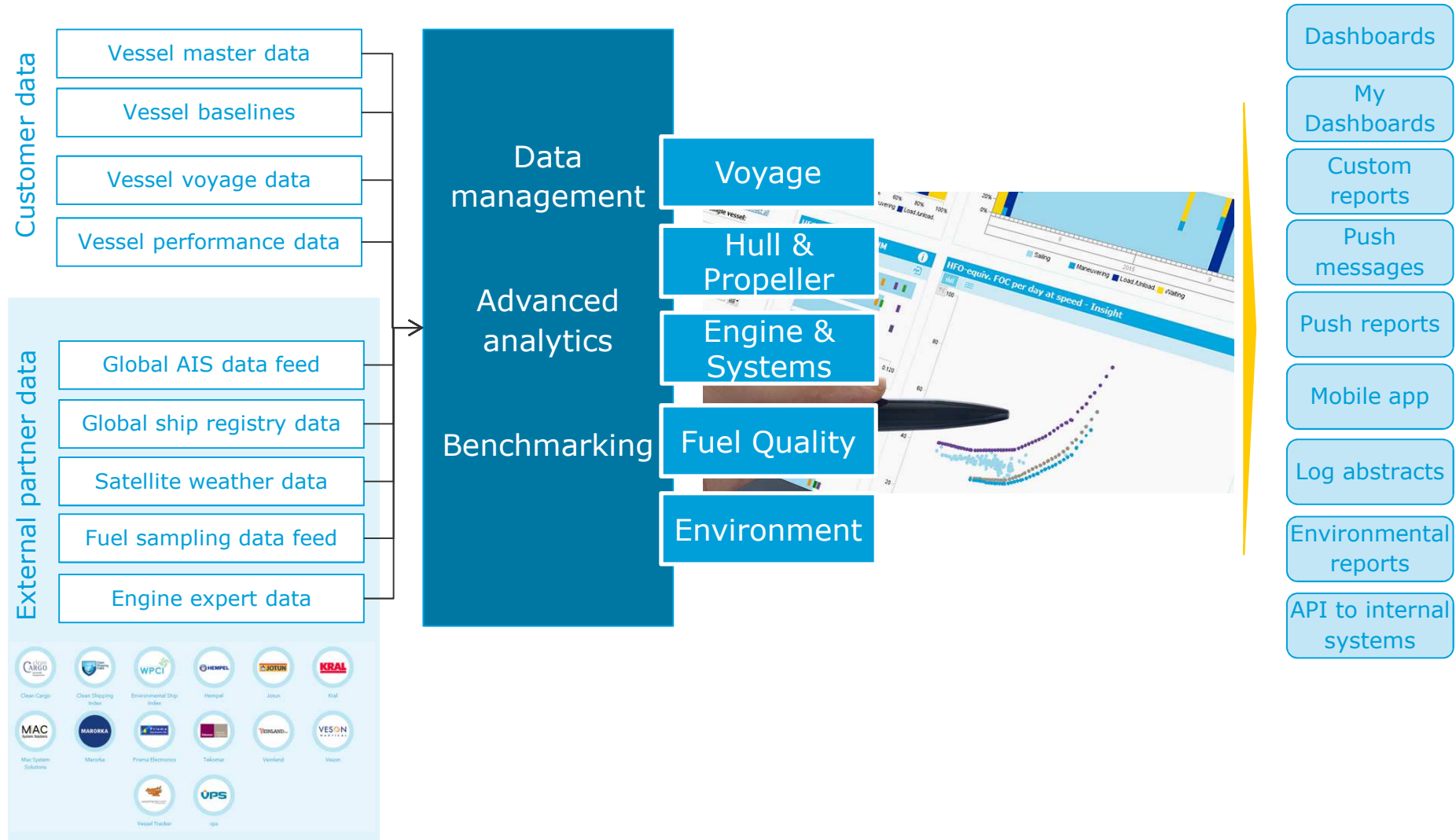
## Example: Sensors on modern vessels collect tons of data to be used



Source: Maersk 2015



# Use Cases: ECO Insight- from launch to the largest performance solution in shipping in 2 years with >1.000 vessels



# Use Cases: Operations could be further optimized through real time performance management and Condition based maintenance



e.g. Maersk Voyage Centre in Mumbai



e.g. ABB Condition Monitoring for Motors & Generators

## ■ What is it about?

- Real time Fleet Performance Management and Conditions Based Maintenance out of central fleet control centres
- Optimisation of operational efficiency (focus fuel efficiency), maintenance cost and downtime

## ■ What is the status?

Real time FPM established by some early movers (e.g. Maersk, Hapag Lloyd, CMA CGM); Condition based maintenance available but not well accepted yet

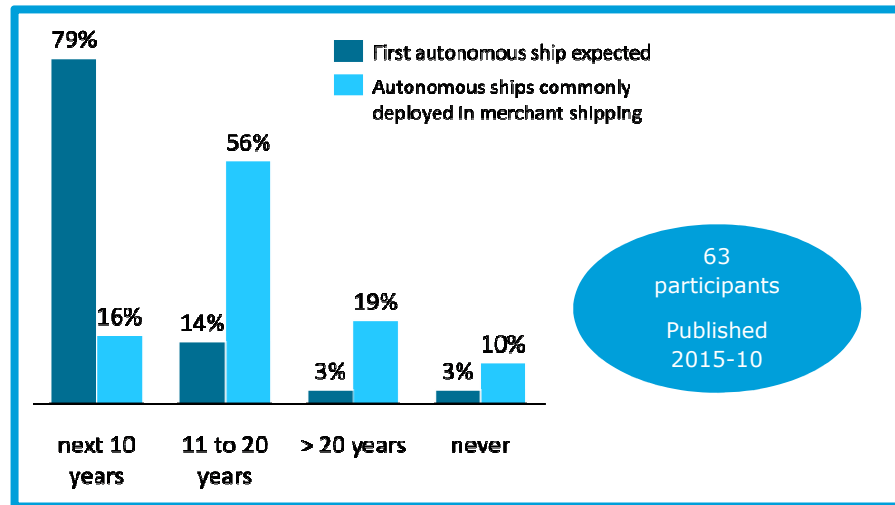
# Use Cases: Cost and human element related risk could be reduced through unmanned, remote controlled or autonomous ships



e.g. AAWA Initiative



e.g. DNV GL Revolt



MUNIN Project forecast on autonomous ships

## What is it about?

- Unmanned, remote controlled or autonomous merchant ship
- Reduction of cost and human element related risk

## What is the status?

Several projects ongoing to explore economic, social, legal, regulatory and technological benefits and barriers

## Use Cases: Some new business models have come up in shipping...



Computer based training and crew competency management



Market place for purchasing goods and service in shipping



Ocean freight intelligence platform, price and freight-time benchmarking service for container



X-Change: Market place for the exchange of container equipment and vessel/train/truck slots



Ship valuation platform

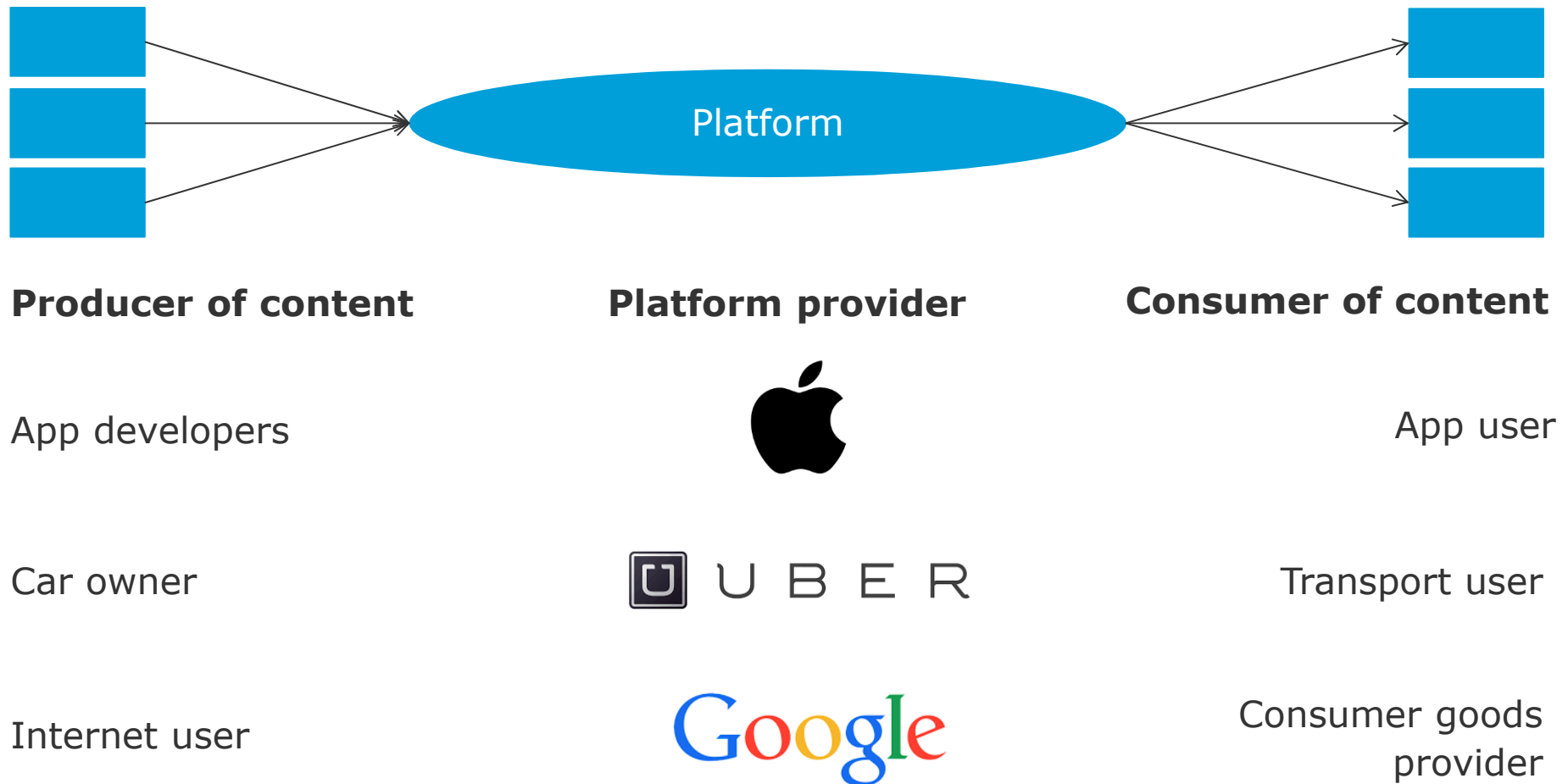


ECO Insight

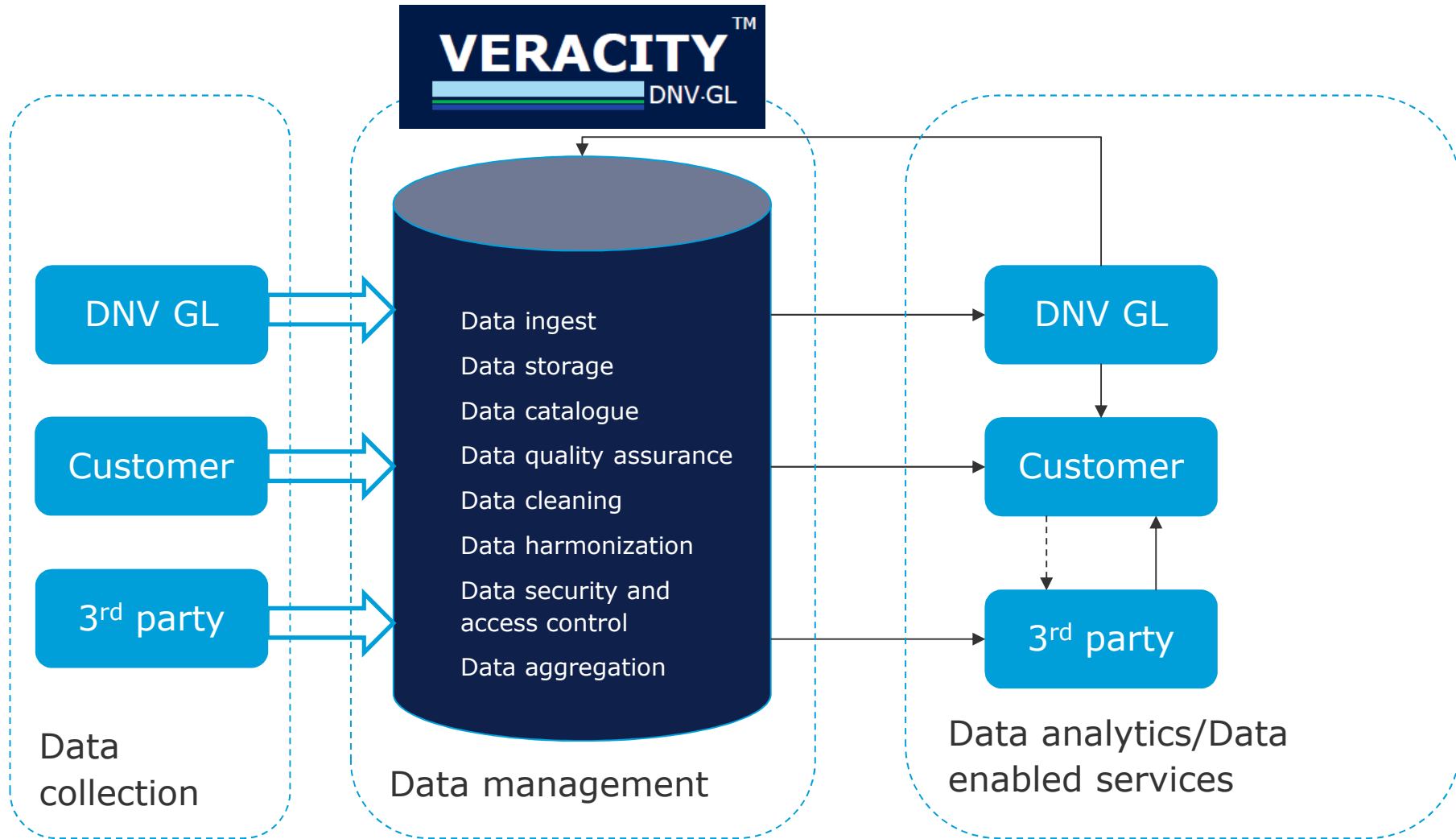
Fleet Performance management platform

Exponential growth if working

## ... and everybody is talking about a "platform"



# Moving up: Inviting the industry to join – DNV GL Veracity platform



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“

**What can be digitalized  
will be digitalized**

”

Carly Fiorina

## What to do now?

- Embrace working with much more data than in the past
  - Have “analyst” type positions that help you drive this
  - Work together with strong partners, each single shipping company is too small to invest
  - Look for focused business cases to see the benefit (e.g. performance)
  - Start now
- 
- Do not ignore the massive change
  - Do not think a bit more excel is a solution





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“

We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten.

Bill Gates

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# Thank you for your attention

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