



Elbe 4.0 – Splunk IoT within the Port of Hamburg

Improving Cost-efficiency of Inland Cargo Shipping

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ESE

Engineering and Software-Entwicklung

Operational Divisions

- Rail Operations
- Automotive Production
- Manufacturing Industry

Range Of Services

- Software-Engineering
- Testing & Verification
- Assessment-Services
- Data Analytics





Project Overview

Port & Assets

Port Of Hamburg

landmark • employment • transit

- 28.57 sq miArea
- 8.700.000 containers / year
- 268.689 dependent german jobs
- 21.800.000.000 € moved value/year
- 135.000.000 tonnes transported goods/year

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Enterprise Industrial IoT Projects

Showcase of ESE reference project

Asset Park (PoC)

- Harbour Tugboats
- Transport Barges
- Various manufacturers
- Service age from recent to 70 years old

Splunk Use Case

- Monitor machine fleet
- capture and correlate Sensor Data
- Visualize movement patterns
- Correlation to databases (Carriage Load & Tide)

*compare energy
consumption to model**

Stakeholders

- Shipping companies
- Universities
- German Authorities

[fancyrave@unsplash](https://unsplash.com/@fancyrave)

* statistical / theoretical model, simulating energy consumption levels

Insert: Project Demonstration Video

Playbook

- Introduction by project tech lead
- Drone flight over harbor / landmarks / Asset
- Closeup on ship
- Tech. details by customer
- Hardware onboarding solution
- Schematics of data delivery

Proof of Concept (PoC)

Getting Started

Scenario: boats not naturally IoT compatible

- Concept
- Pick an asset that seems promising
- Link Raw Events to Indexer
- Create Barebones Dashboard
- Present Results to Customer

Installation

- Choose industrial-grade ruggedized IoT-Router
- Investigate safest spot for Hardware installation
- Link Router to information network of the boat
- Splunk input for Box-Data
- Transmit data via cellular network



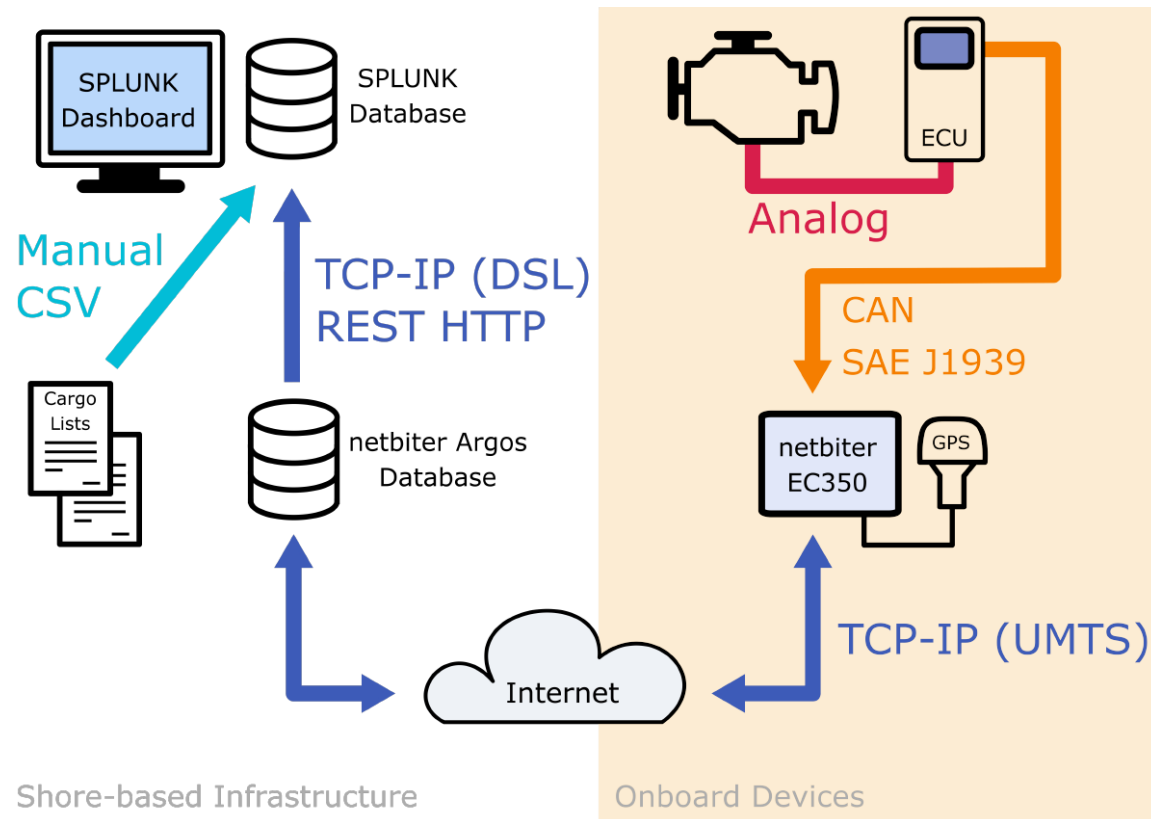


Asset Onboarding

Box Installation & Splunk Config

Monitoring Your IIoT Project

Where are we now?!

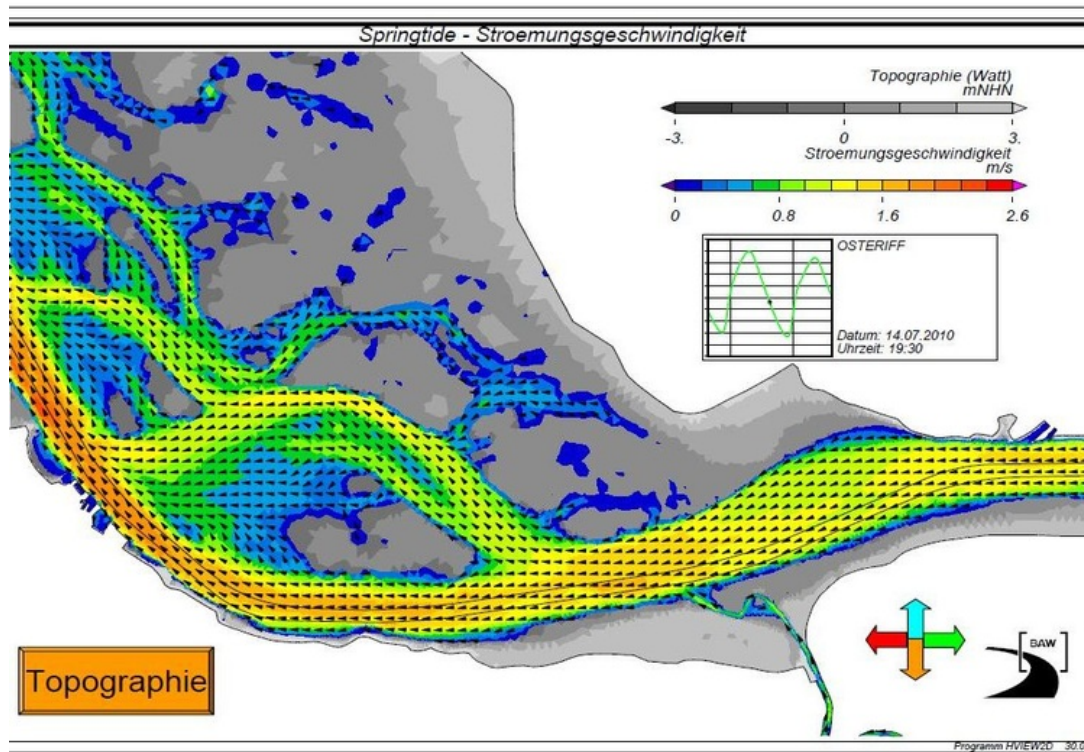


Monitoring the IIoT Project

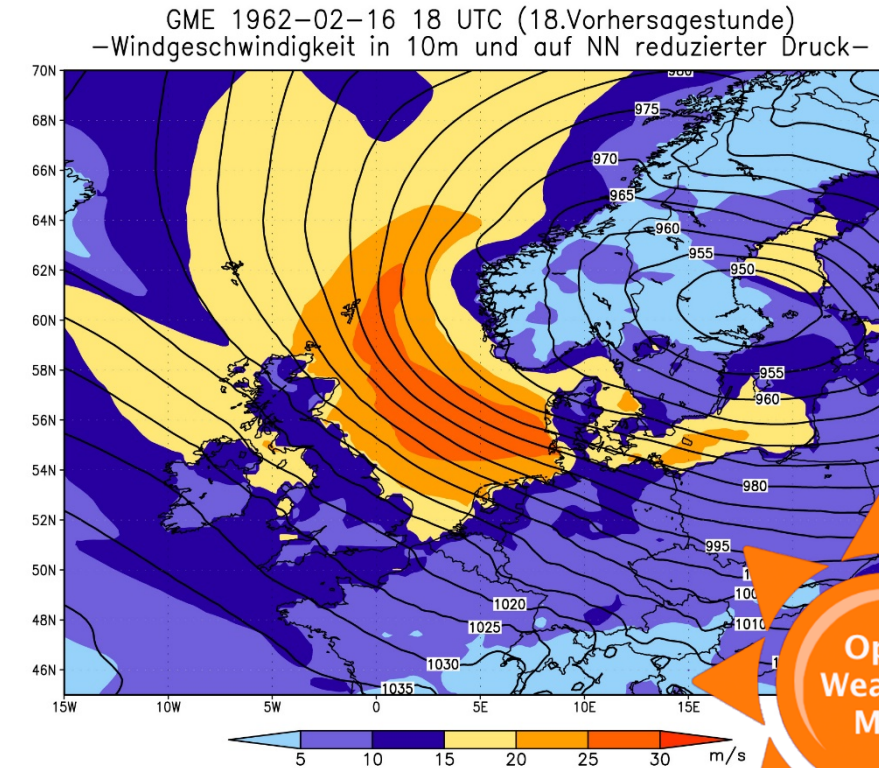
Where are we now?!



Inclusion of external Data Resources



Flow Current Data



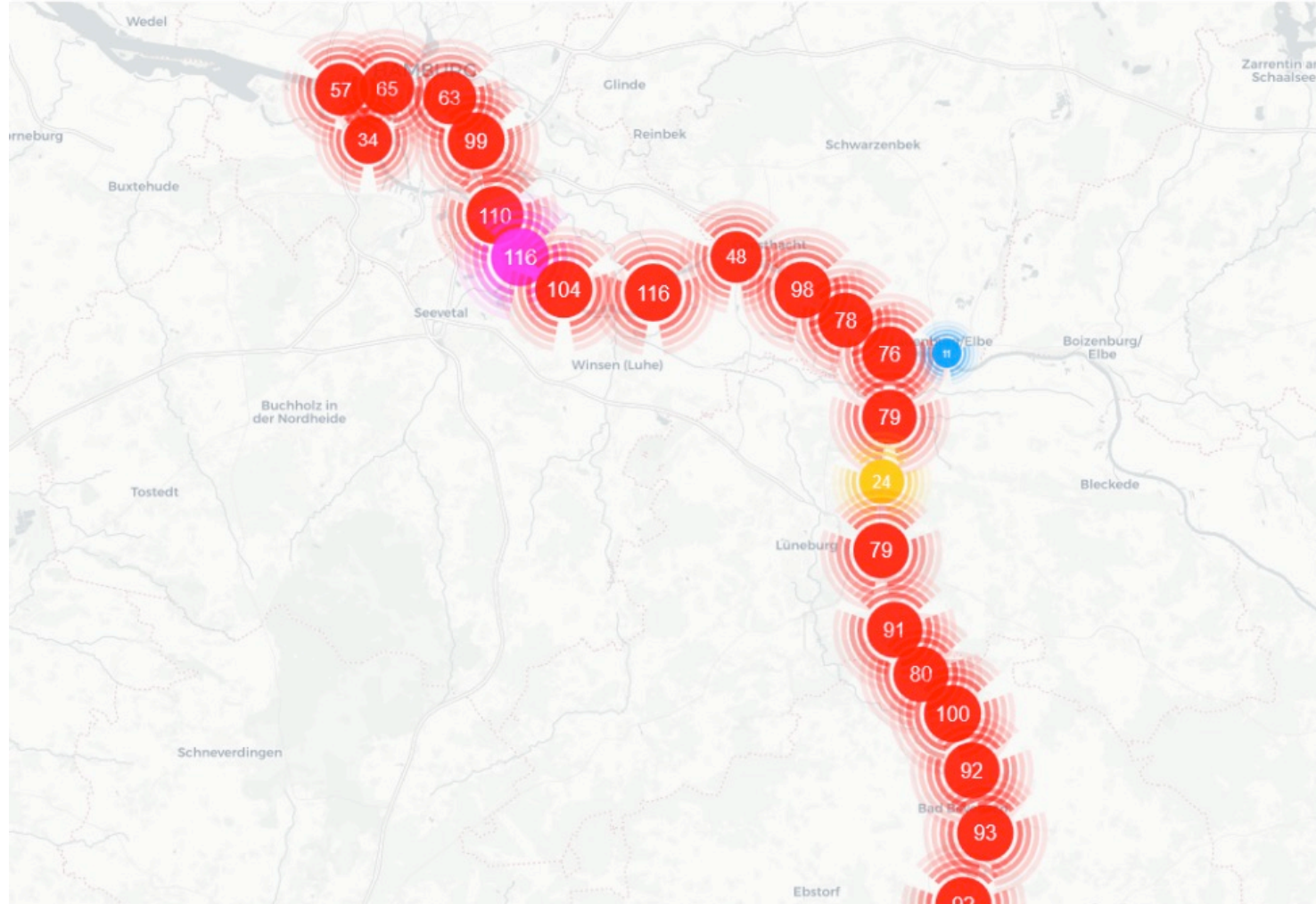
Weather Data



Dashboarding & Research

Data Validation

Dashboard Development



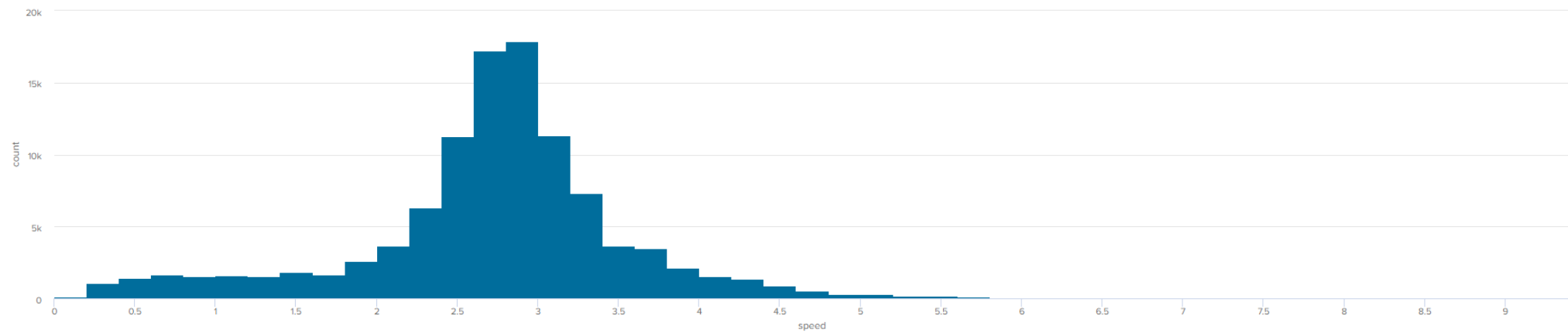


Dashboarding & Research

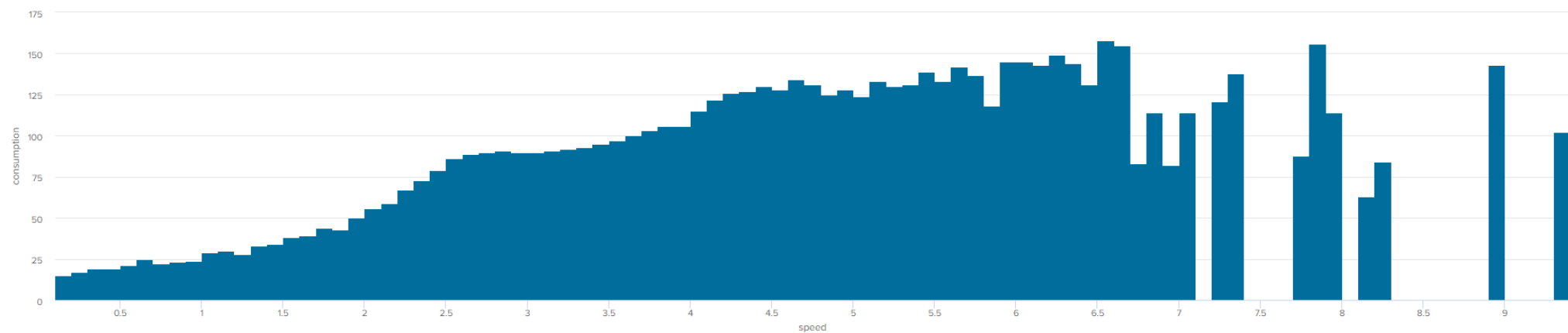
Correlations & Constraints

Dashboard Development

Data Count



Relevance Speed - Consumption (Speed < 18)



Dashboard Development

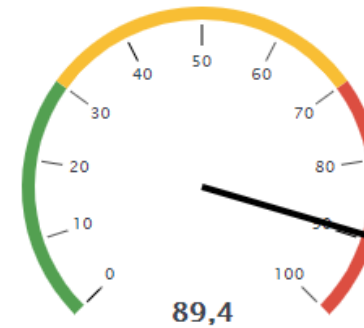
Average Cargo Weight Upstream

650,2 t

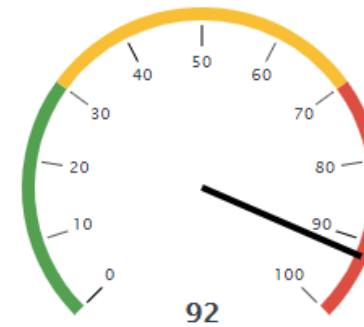
Average Cargo Weight Downstream

743,3 t

Average Consumption Upstream

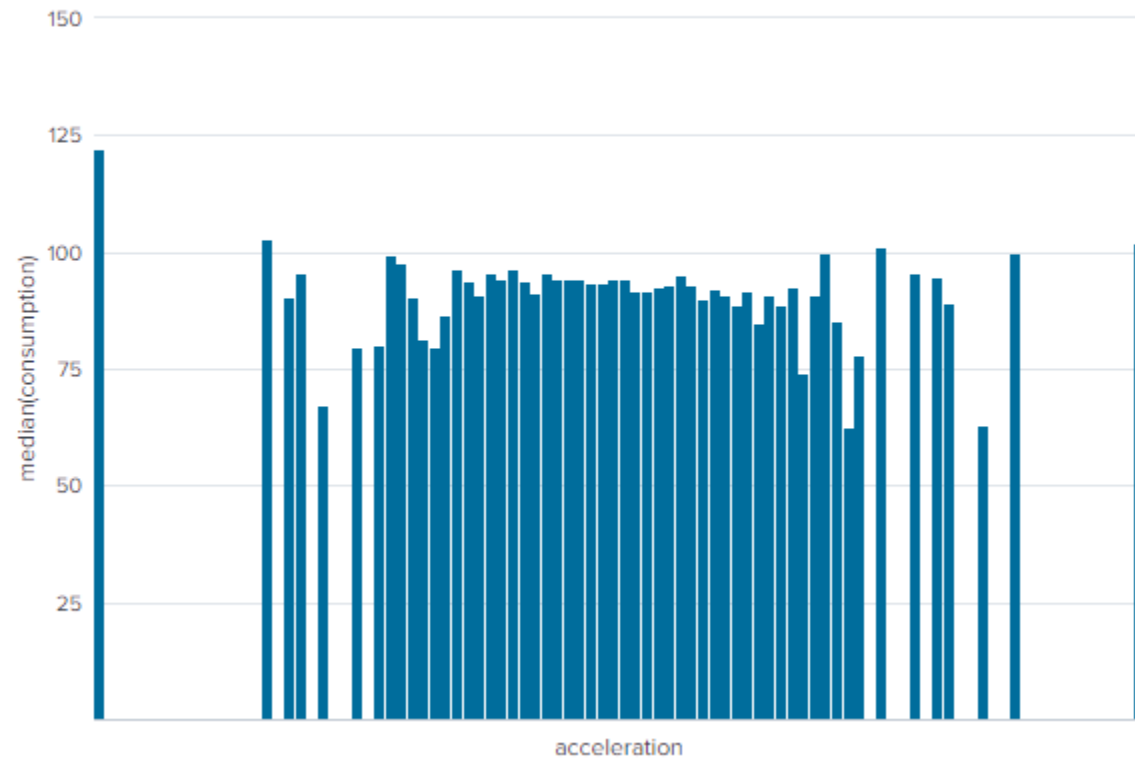


Average Consumption Downstream

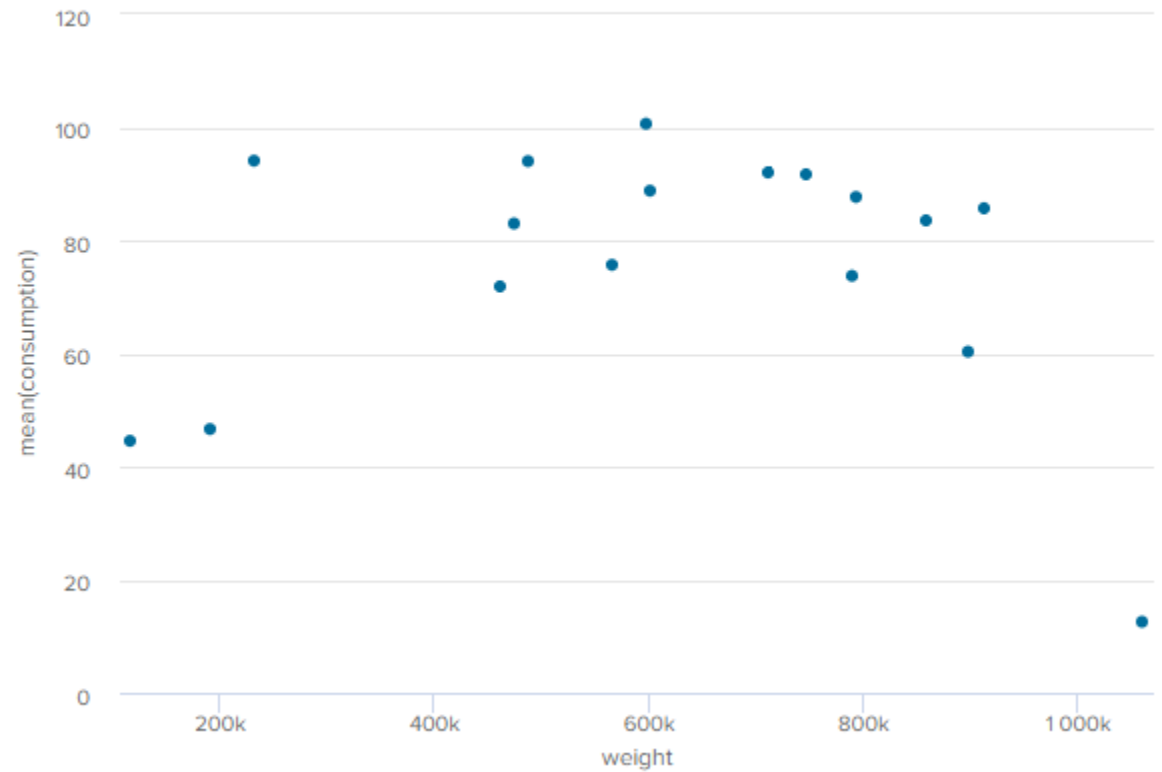


Dashboard Development

Relevance Acceleration - Consumption



Relevance Weight - Consumption

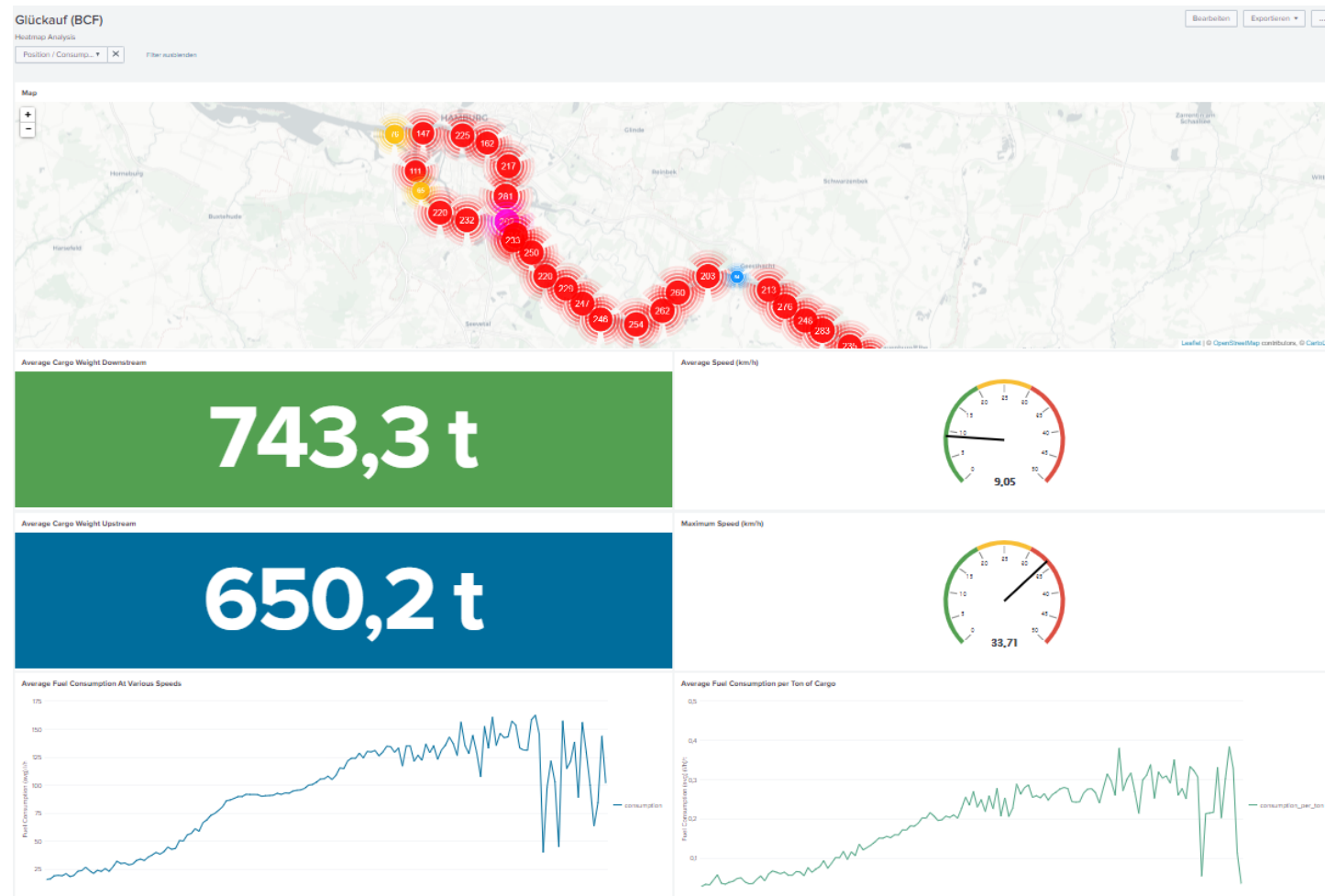




Dashboarding & Marketing

Data Validation

Dashboard Development



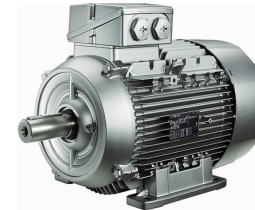
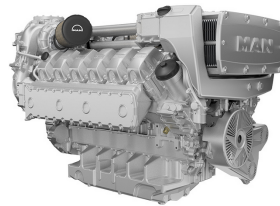


Results

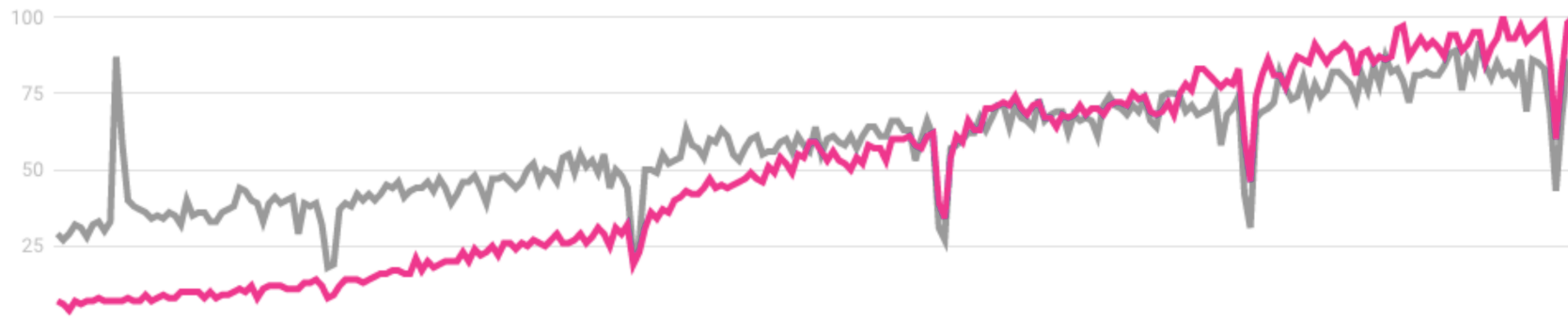
Analytic approach & results

Research: Next Steps

Diesel Engine (measurements) / Electric Engine (model)



Electric Diesel



Continuous update on efficiency control

- Consumption peaks on high speeds
- Planned energy units per ton of freight

What comes next?

1. More Comprehensive Data Aggregation
for statistically reliable results
2. More ships
3. More data sources
4. More assets

Key Takeaways

1. Digitisation affects many stakeholders in inland cargo shipping
2. Splunk enables us to use data analytics even for very old assets
3. we can find correlations and results fast and easily



Thank You!

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