

Vessel Accumulation Dashboard

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Meet the Team & the AA CoE

The Advanced Analytics (AA) CoE provides impactful data & analytics capabilities and services for the Swiss Re Group, relying on a Global team of analytics Experts.

The AA CoE data science capabilities span from generic data analysis to sophisticated modelling of structured and unstructured data.

Our services include strategy & governance support, communities fostering across the group, as well as analytics services to help our clients grow their business, enhance their efficiency and increase their profitability with better understanding of risk insights, via descriptive, predictive and preventive actionable insights



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Maritime supply chain is the backbone of today global supply chain

- The volume of goods transported by cargo doubled from 1990 to 2020, reaching ~11 billion tons in 2022, equivalent to ~80% of global goods traded.
- The capacity of vessels has been constantly increasing in the last years, reaching a capacity of 24,346 containers (TEUs) in 2023 (MSC Irina).
- Ports are bottlenecks of the supply chain network, with a high concentration of goods. The top 100 ports in terms of vessel capacity manages ~75% of the global goods traded via vessels.



Reasons and Impact of Port Congestions

Reasons:

high traffic volume,
Covid, strikes,
NatCat,
geopolitical
conflicts

2021 vs. pre-Covid

+25% of total
travel time
(~1.5 days)¹

In 2021

+\$321 m inventory
cost
&
-\$184m revenue¹

¹caused by supply chain disruption and port congestions

Komaromi, A., Cerdeiro, D. A., & Liu, Y. (2022, March 3). Supply Chains and Port Congestion Around the World. Retrieved from International Monetary Fund: <https://www.imf.org/en/Publications/WP/Issues/2022/03/25/Supply-Chains-and-Port-Congestion-Around-the-World-515673>

Digital Supply chain enables real-time tracking of vessels, allowing to point out accumulation risks at ports and plan operations accordingly



Risks understanding

Vessels accumulation at ports can potentially lead to:

- supply chain disruption
- complex port operations
- increased Nat Cat risk exposure
- increased manmade risks



Risks Monitoring

Real-time monitoring of vessels allows to **continuously assess** the status of the supply chain at ports, **assessing disruption risks**.

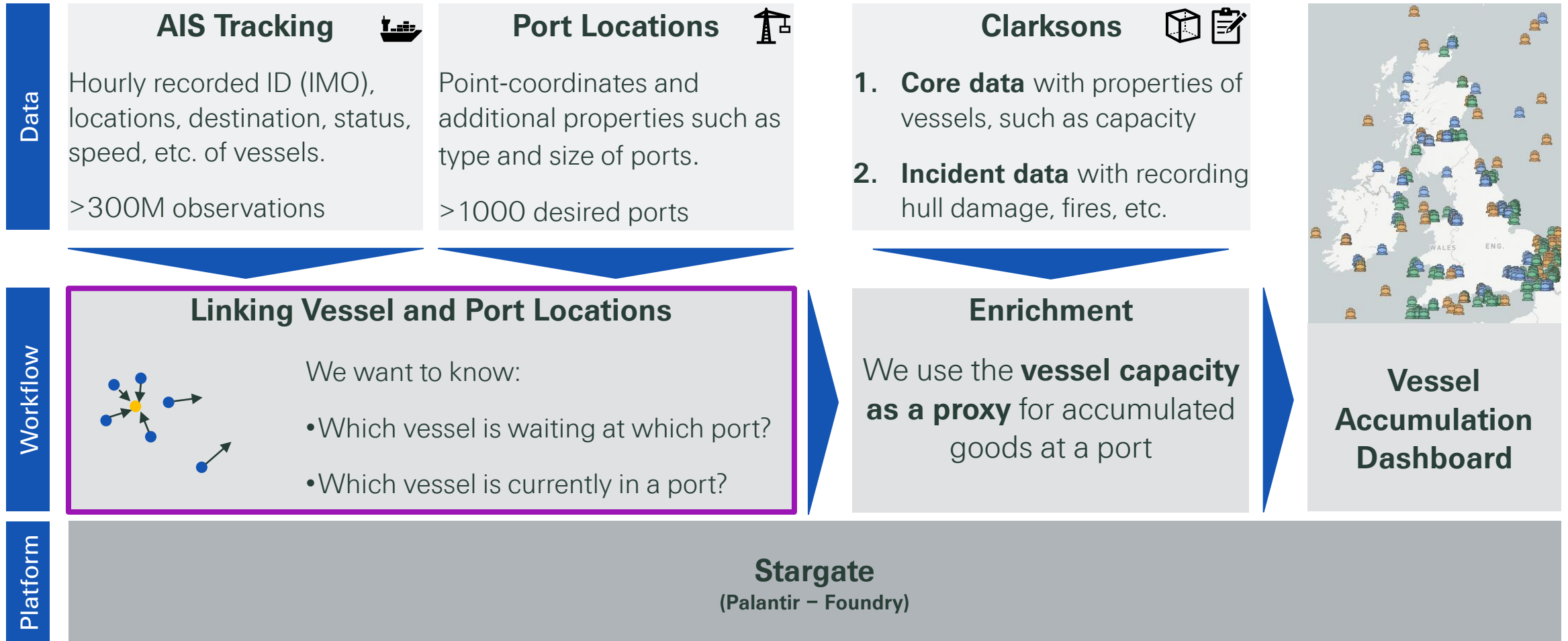
However, the almost **real-time vessels' locations data** – which in our data source are updated on average every hour – pose a **computational challenge**.



Make informed decisions

Supply chain practitioners can take **informed decisions** by assessing the **congestion risk** at critical nodes of the supply chain, such as **ports**, assessing the **impact of unplanned events** on the port operations and monitoring the **risk exposure over time**.

We analyze vessel and port data on a global scale using a fully automated workflow. The entire pipeline from data ingestion to the dashboard is implemented on Stargate.



Linking vessels and ports on a global scale poses a challenge: Ports have different sizes and layouts. We automated the **port area identification** to link vessels to ports.

Screenshot from vesselfinder.com at port Felixstowe in the UK with

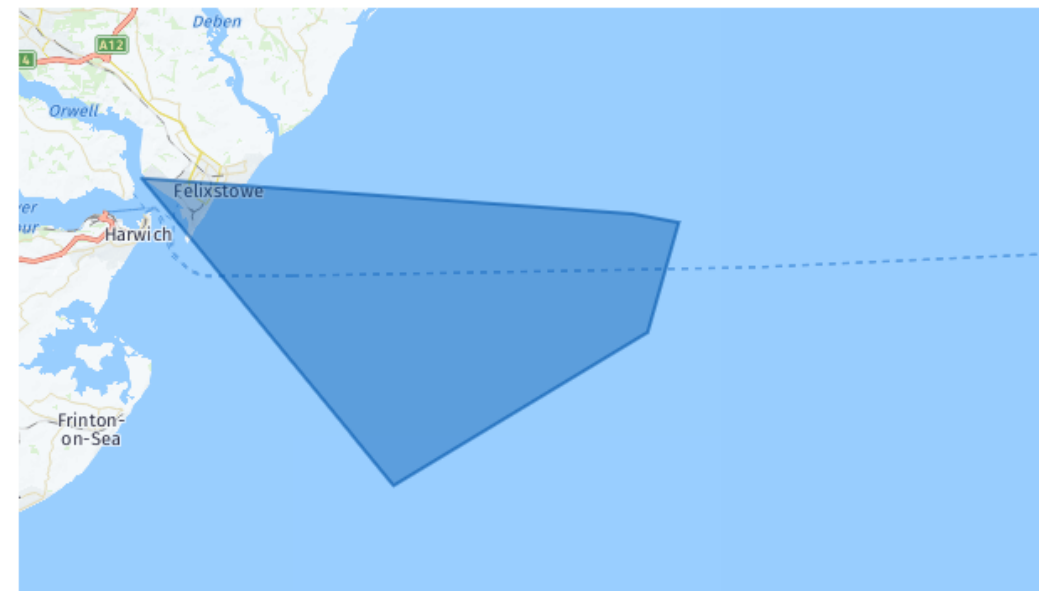
- Point-Location of Port
- Container Terminals
- Waiting Areas (to anchor)



Fully automated solution to recognize port areas using **convex hull** of stationary vessel locations close to port.

```
POLYGON (((1.699358 51.890843, 1.698988 51.89004, 1.697138 51.887692, 1.489233 51.8101, 1.488933 51.810167, 1.283108 51.965452, 1.283167 51.9655, 1.283383 51.96559, 1.684625 51.947672, 1.722562 51.943302, 1.699358 51.890843)))
```

Re-Render Geometry

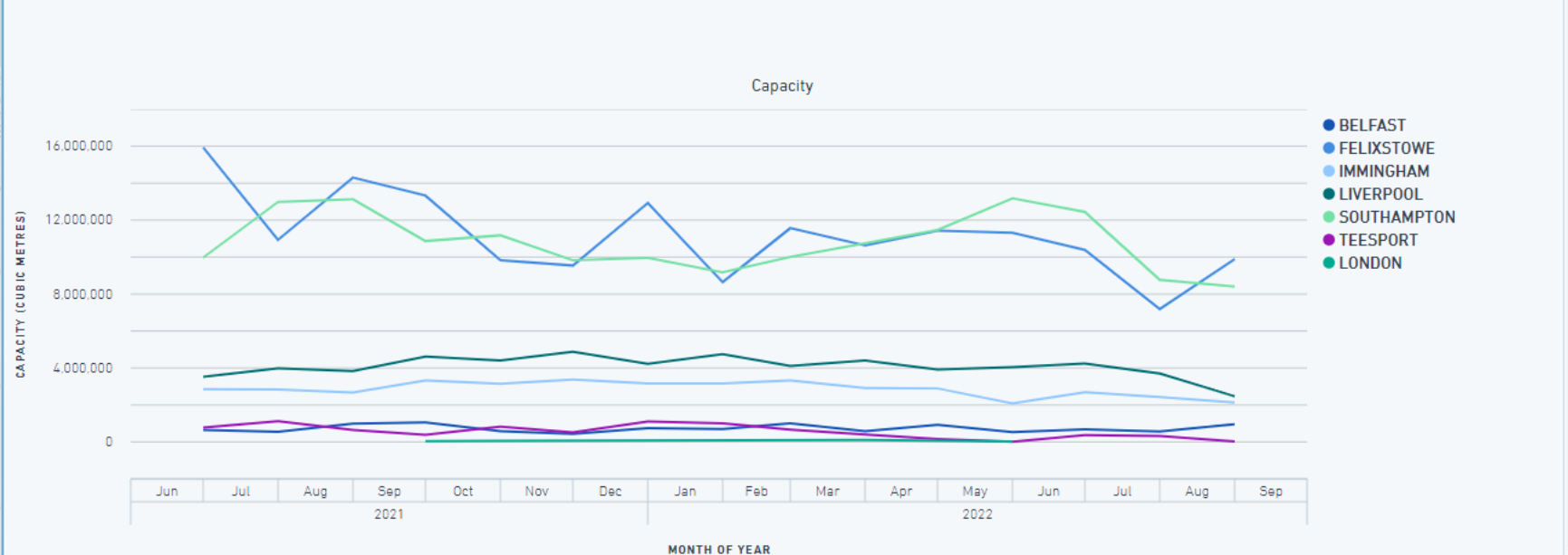
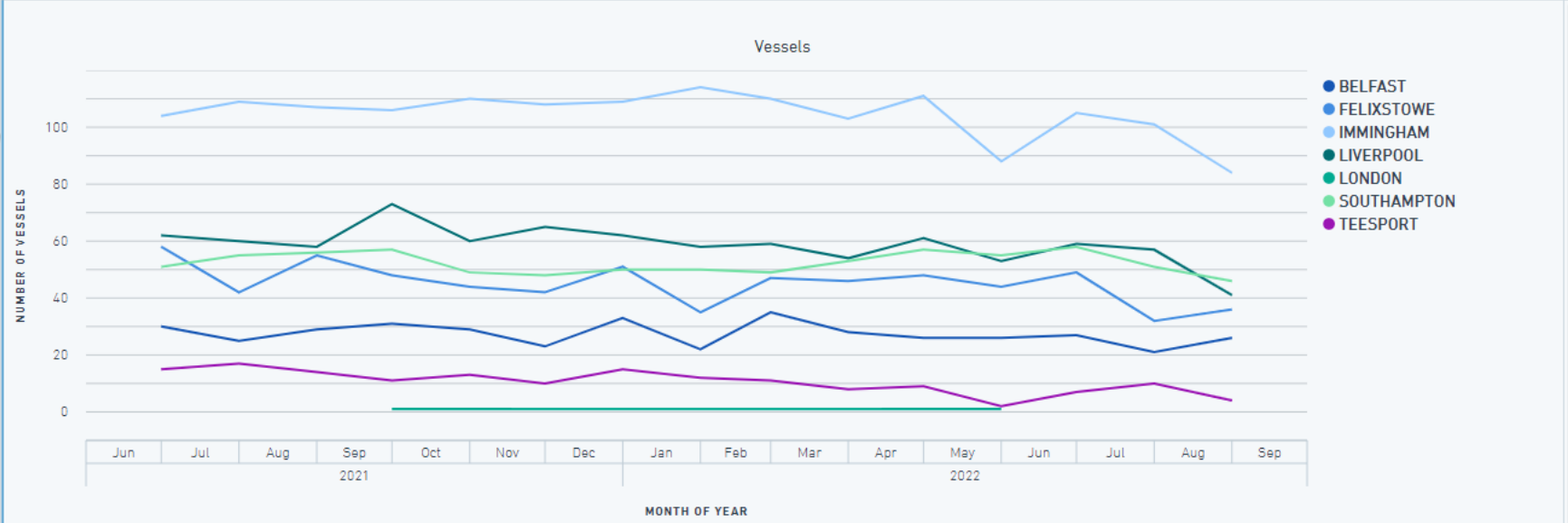


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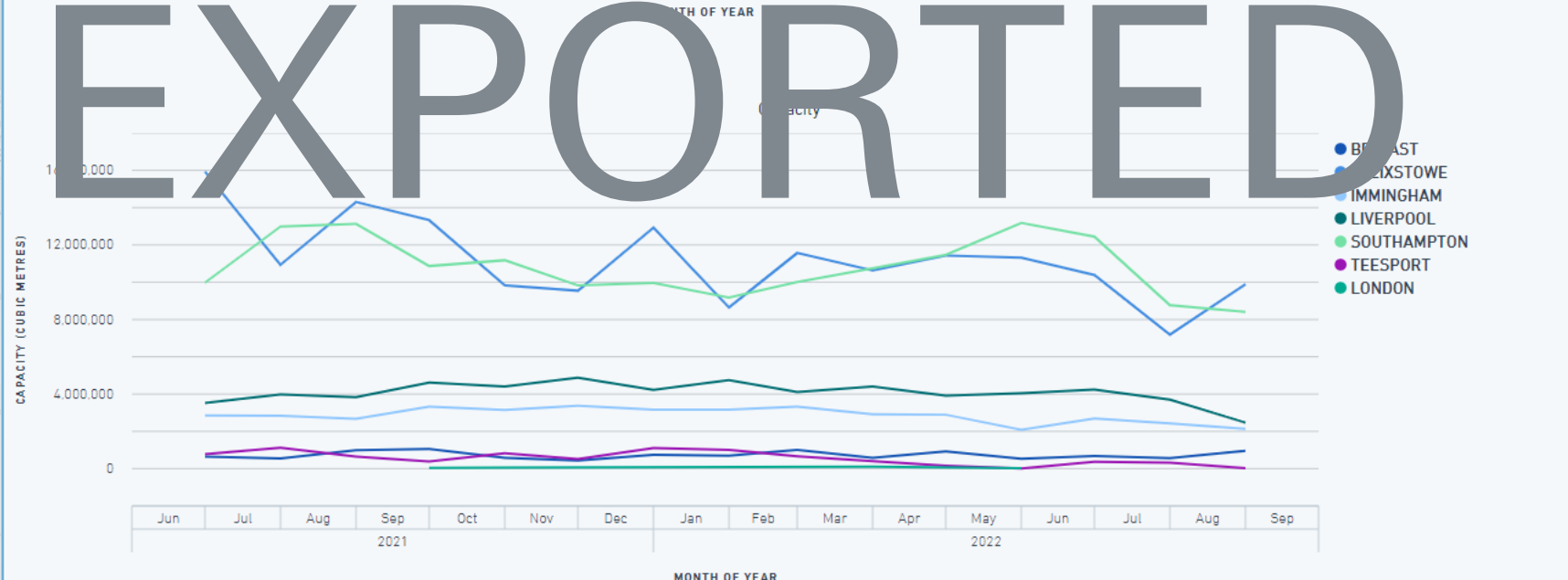
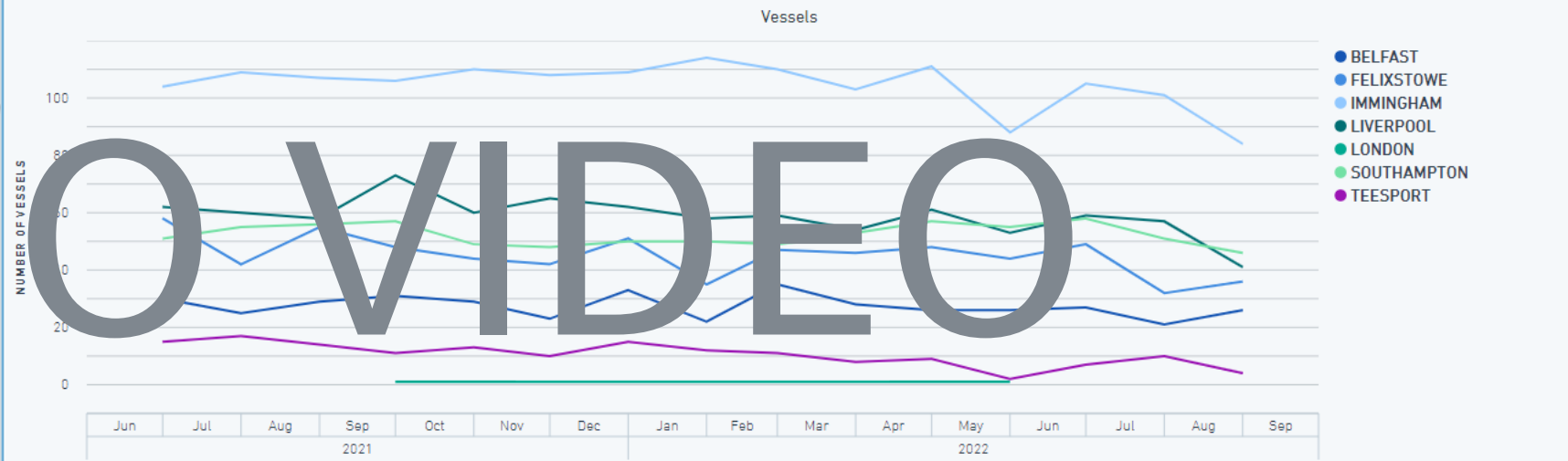


Port Authority: **Overall** | Shipping Company: | Swiss Re

Port Details



Port Authority Shipping Company Swiss Re
Overall Port Details



DEMO

NOT

OVERVIEW

EXPORTED

Conclusion of Demo

01

Informative overview of port activities, e.g.:
Over-proportionally anchored vessel indicate disruption.

02

Sensible KPIs:
It's not only about the number of vessels, but about their capacity and type of goods.

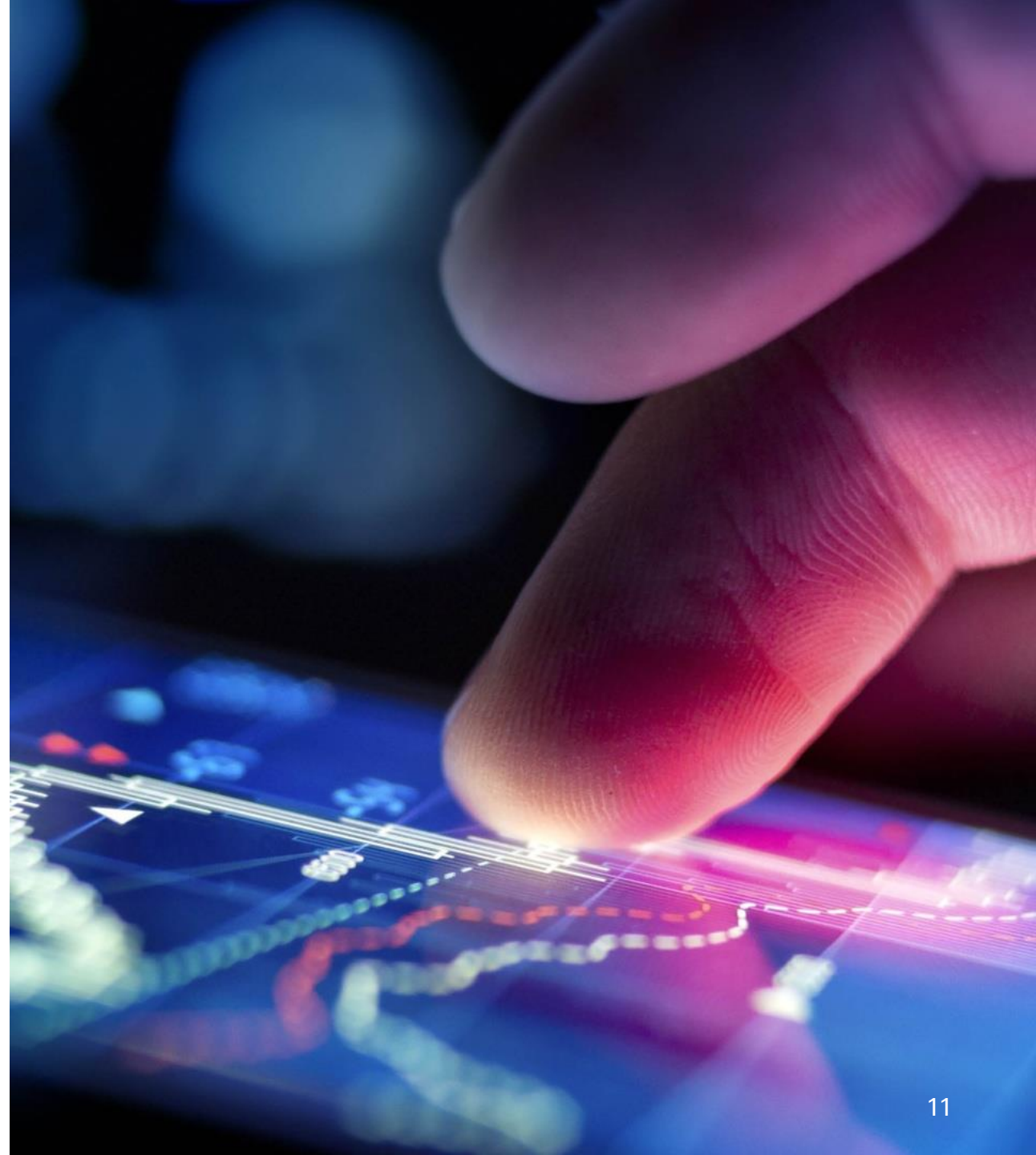
03

Various users require various granularity of information:
Individual shipment tracking to portfolio exposure of vessels



The Vessel Accumulation Dashboard gives control to practitioners to build a resilient supply chain

- The digital transformation of the supply chain allows to continuously assess the **disruption risks of the supply chain**, by providing **risks insights about ports and vessels in real time**.
- Due to **efficient data engineering and preprocessing**, our approach is **highly scalable** as it **solely** requires the **vessel tracking data** and the **location of a port** given by a geo-coordinate as an input for **assessing risk**.
- The **vessel accumulation dashboard** provides **key metrics to uncover hidden vulnerabilities** across the marine supply chain network, enabling practitioner to **take control of their risks** and **make their supply chain more resilient**.



Any
questions?

Thank you!

Contact us



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