


Maritime domain awareness (MDA) is defined by the International Maritime Organization as the effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment.

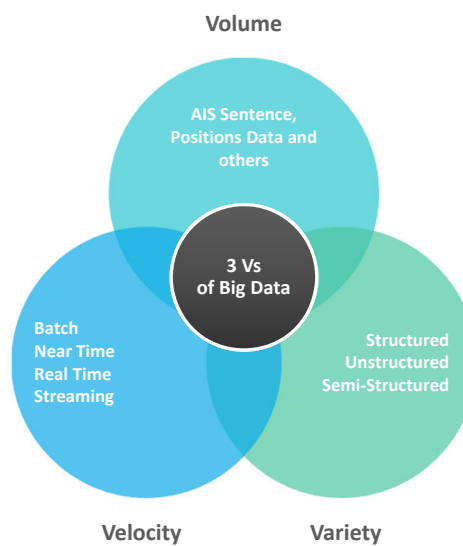


# What Is Big Data?

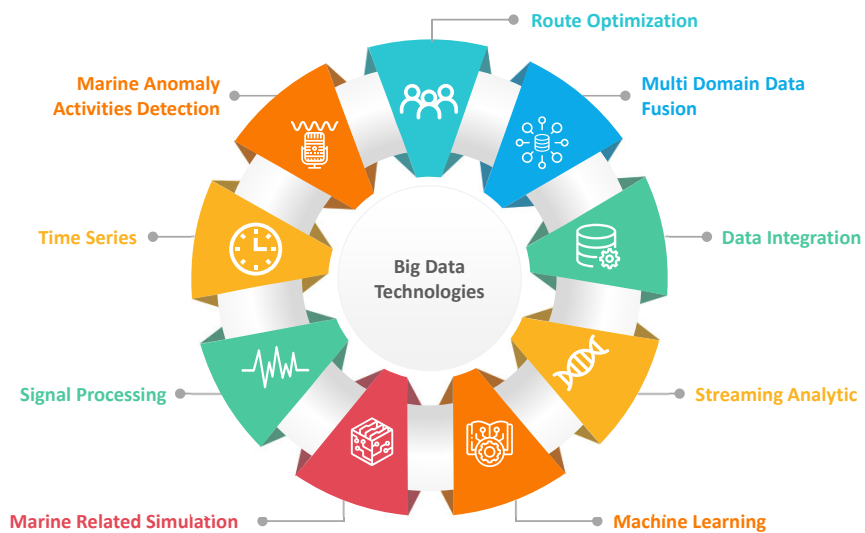
Big Data is used to describe the massive volume of both structured and unstructured data that is so large it is difficult to process using traditional techniques. So Big Data is just what it sounds like — a whole lot of data.



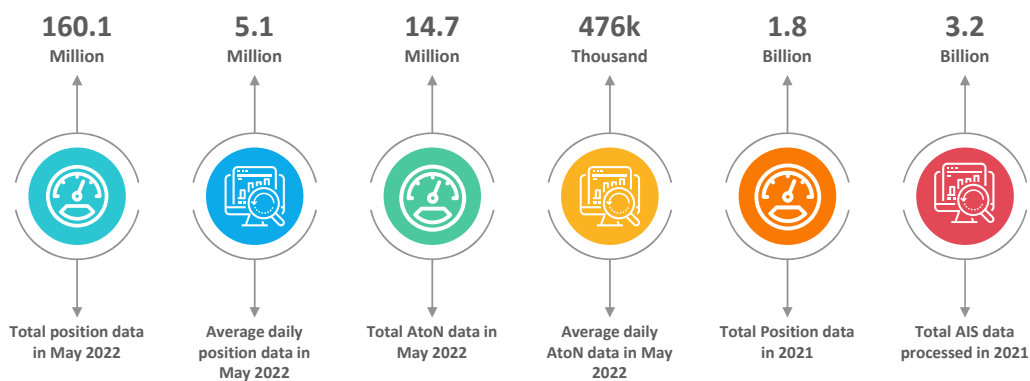
## 3 Vs of Big Data



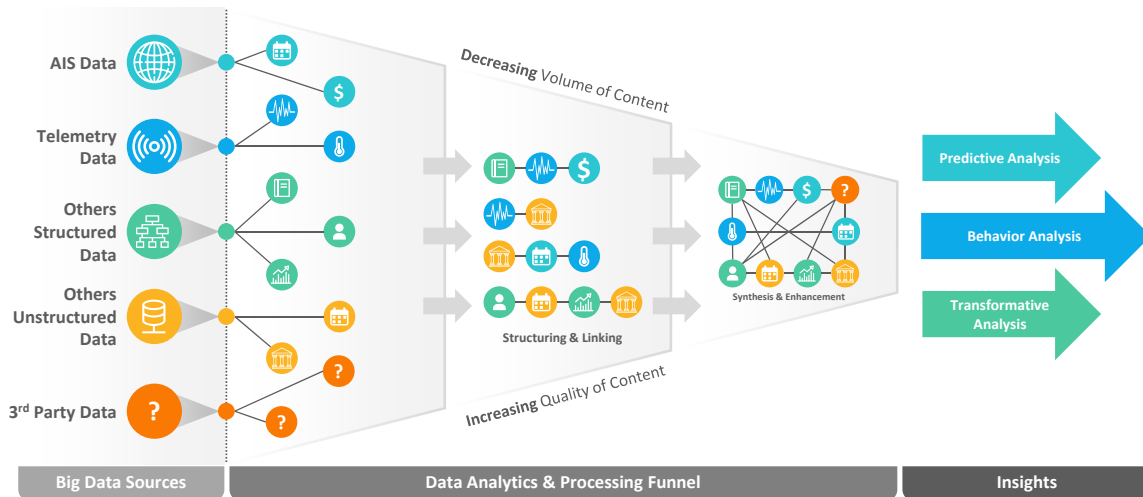
## Big Data Technologies



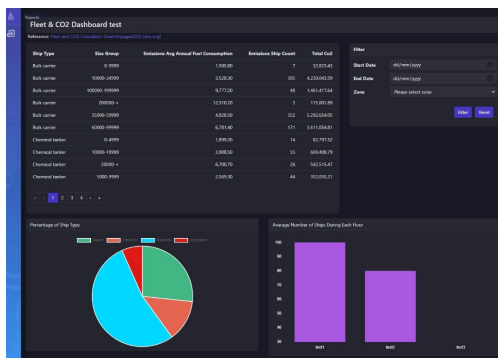
## How Big is Malaysia Maritime Data



## From Data To Insights



## Insight #1 : Streaming Analytic Co2 Calculator



1

Track ships through Malaysia coastal waters using a distributed cluster of the Big Data Platform

2

Featuring streaming over 1 billion rows of AIS (Automated Identification System) tracking data.

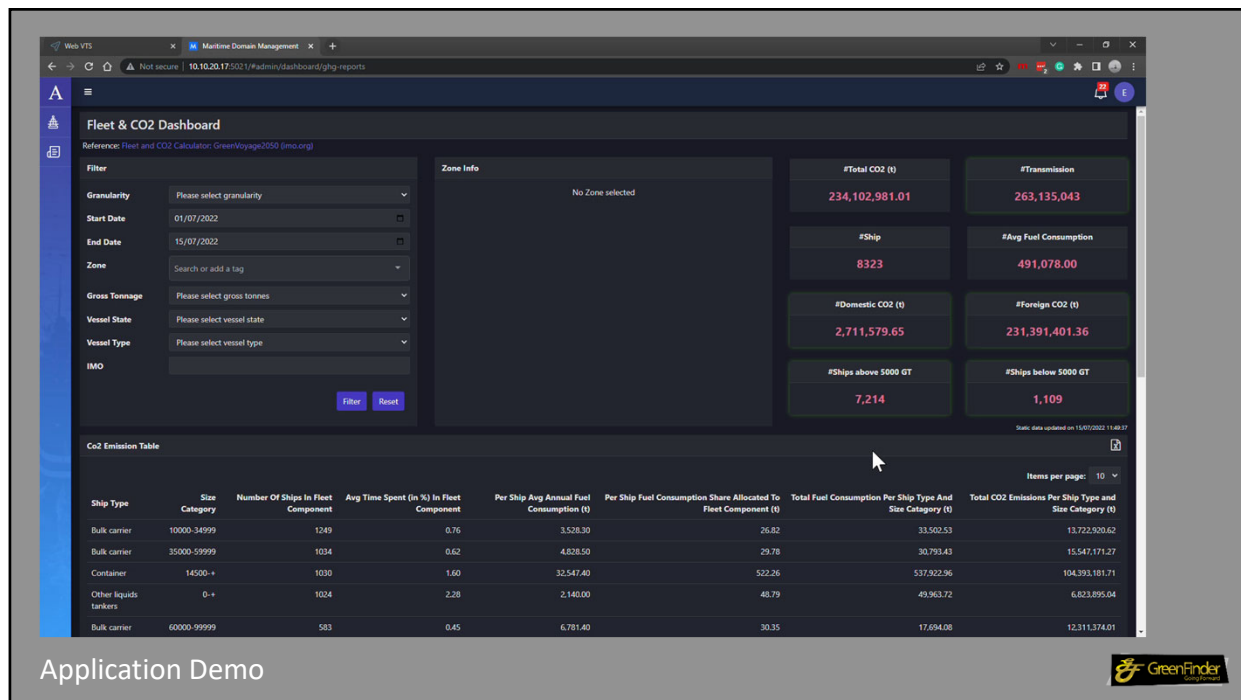
3

Gain instant insights into the volume of CO2 emission.

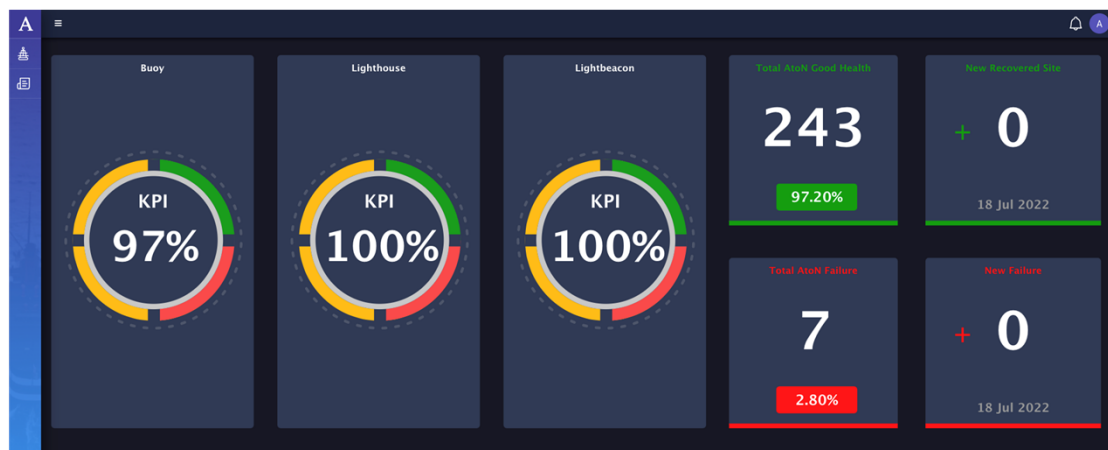
4

Analysis is based on shipping traffic along Malacca Straits and around major Malaysian ports



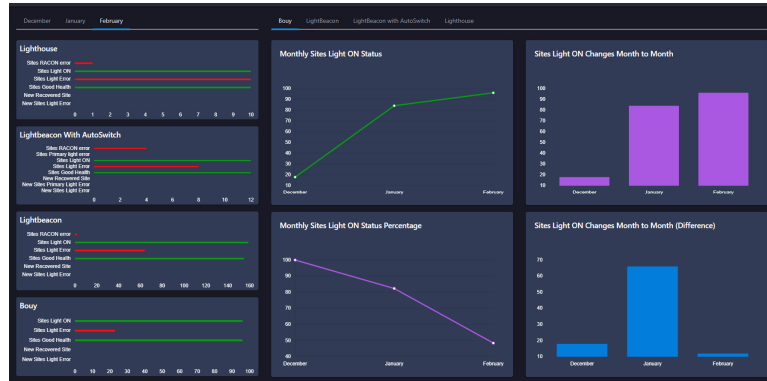
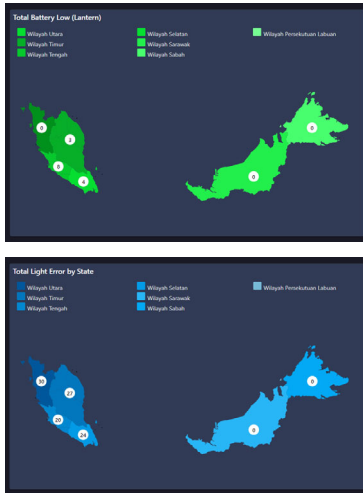


## Insight #2 : AtoN Realtime Analytic



## Dashboard Application

AtoN Realtime Analytic



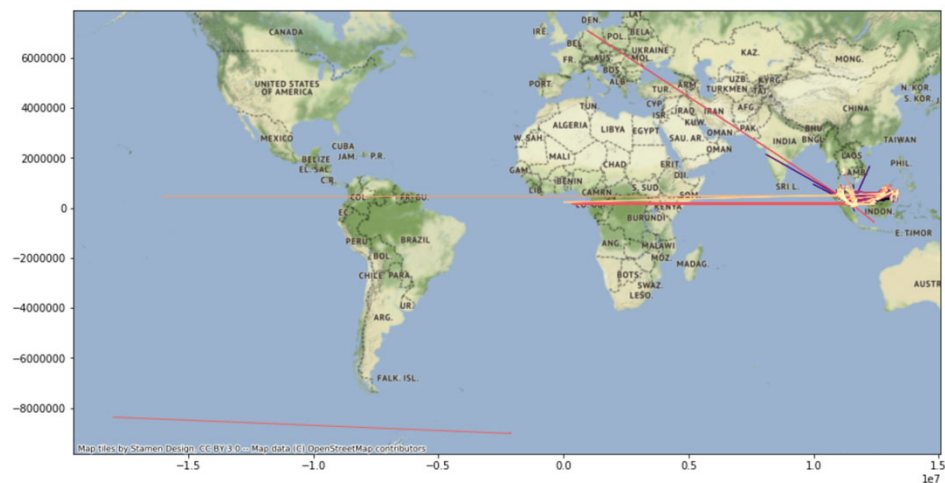
	static_mmsi	callSign	vendorId	shipType
1	0	▶["@@@@@@", "YDA3434"]	▶["N000000"]	▶[0]
2	106000000	▶[" @@@@@@"]	▶["H@@@@N%", "H@@@@K"]	▶[70]
3	200000000	▶["YD 6797", "@@@@@"]	▶["ICODNU@", "N000000"]	▶[70, 31]
4	222222222	▶["@@@@@"]	▶["SMTD\$8_", "@@@@@"]	▶[70, 38]
5	312927000	▶["V3H1@@@"]	▶["H@@@@N%", "H@@@@K"]	▶[50]
6	373514000	▶["HP4783 "]	▶["FEC0001", "FEC@@@"]	▶[37]
7	374061000	▶["3FSO8@@"]	▶["THRE\2J"]	▶[82, 80]
8	412000002	▶["0@@@@@@", "@@@@@"]	▶["@@@@@"]	▶[30]
9	412326855	▶["BZSC3 ", "BZSC3@@"]	▶["AMC@@@I", "T=0A%F"]	▶[30]
10	416002847	▶["BJ4886@"]	▶["REQGI"U", "U?=2A'E"]	▶[30]
11	416058800	▶["BH3039@"]	▶["L#T0AJ", "MO?AT5"]	▶[30]
12	457202000	▶["JVMC7 "]	▶["H@@@@N%", "H@@@@K"]	▶[52]

Basic MMSI duplicate analysis base on different callSign, vendorId or shipType for Jan 2021. Current approach is inaccurate due to some MMSI using exact same static data. Better approach is to use ML with clustering technic such as K-Mean or DBSCAN

Insight #3 : Duplicate MMSI Using Machine Learning

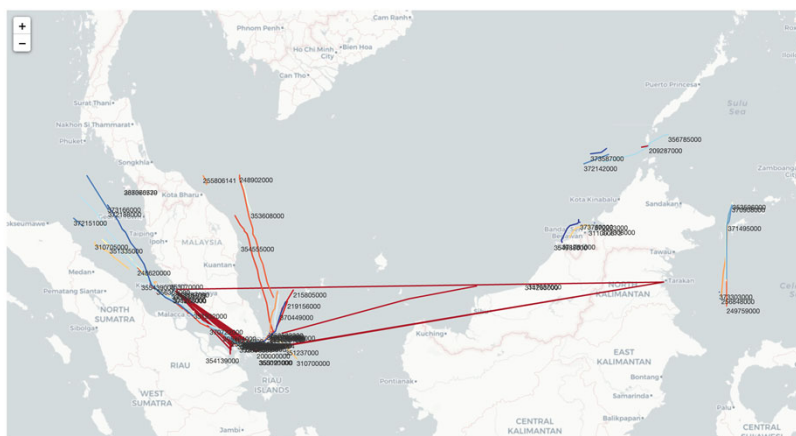
## Data Exploration : Problem Visualization

Detecting MMSI Spoofing Using Machine Learning



## Data Exploration : Preparation

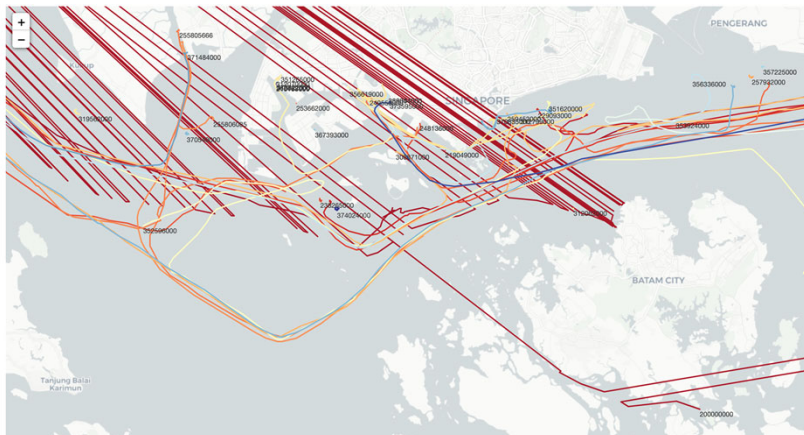
Detecting MMSI Spoofing Using Machine Learning



Data is further reduced  
and filtered to identified  
anomalies

## Data Exploration : Identifying the Anomalies

Detecting MMSI Spoofing Using Machine Learning

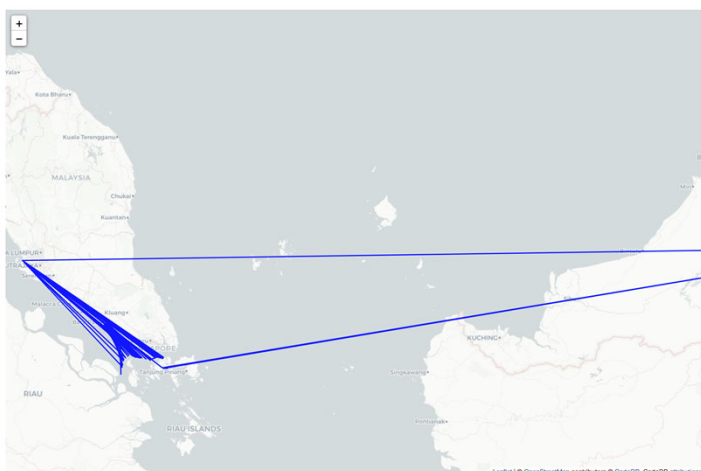


Visually identifying the anomalies



## Data Exploration : Identifying the Anomalies

Detecting MMSI Spoofing Using Machine Learning



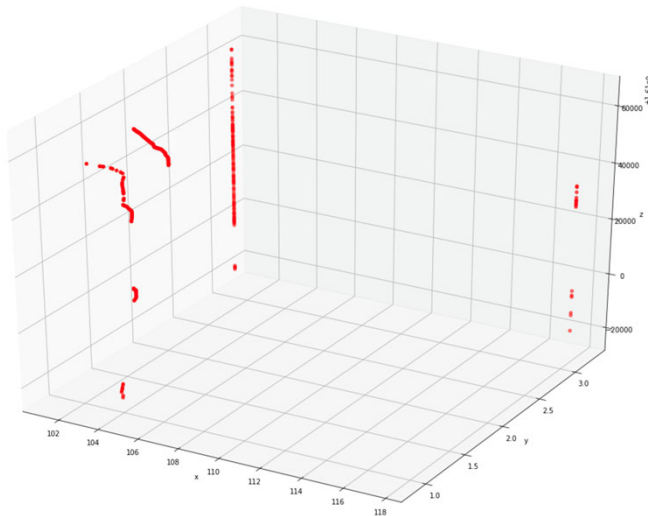
Separating the identified spoofing MMSI





## Data Exploration : Identifying the Anomalies

Detecting MMSI Spoofing Using Machine Learning



Plotting the separated data in 3D scatter diagram to validate the spoofing activities



## Data Driven Strategy & Tactical Operation



### Data Driven Decision Making

Improves strategic & tactical decisions based on insight from data analytic



### Proactive Measure

Uses predictive analysis based on streaming analytics to prevent bad events in the future



### Finding Needle in The Haystack

Explores un-informed and invisible data or insight through real-time transformative or behavior analysis







**BIG  
DATA**

In conclusion, Big Data Analytics could significantly improve timely decision making in the maritime domain.



thank//you

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