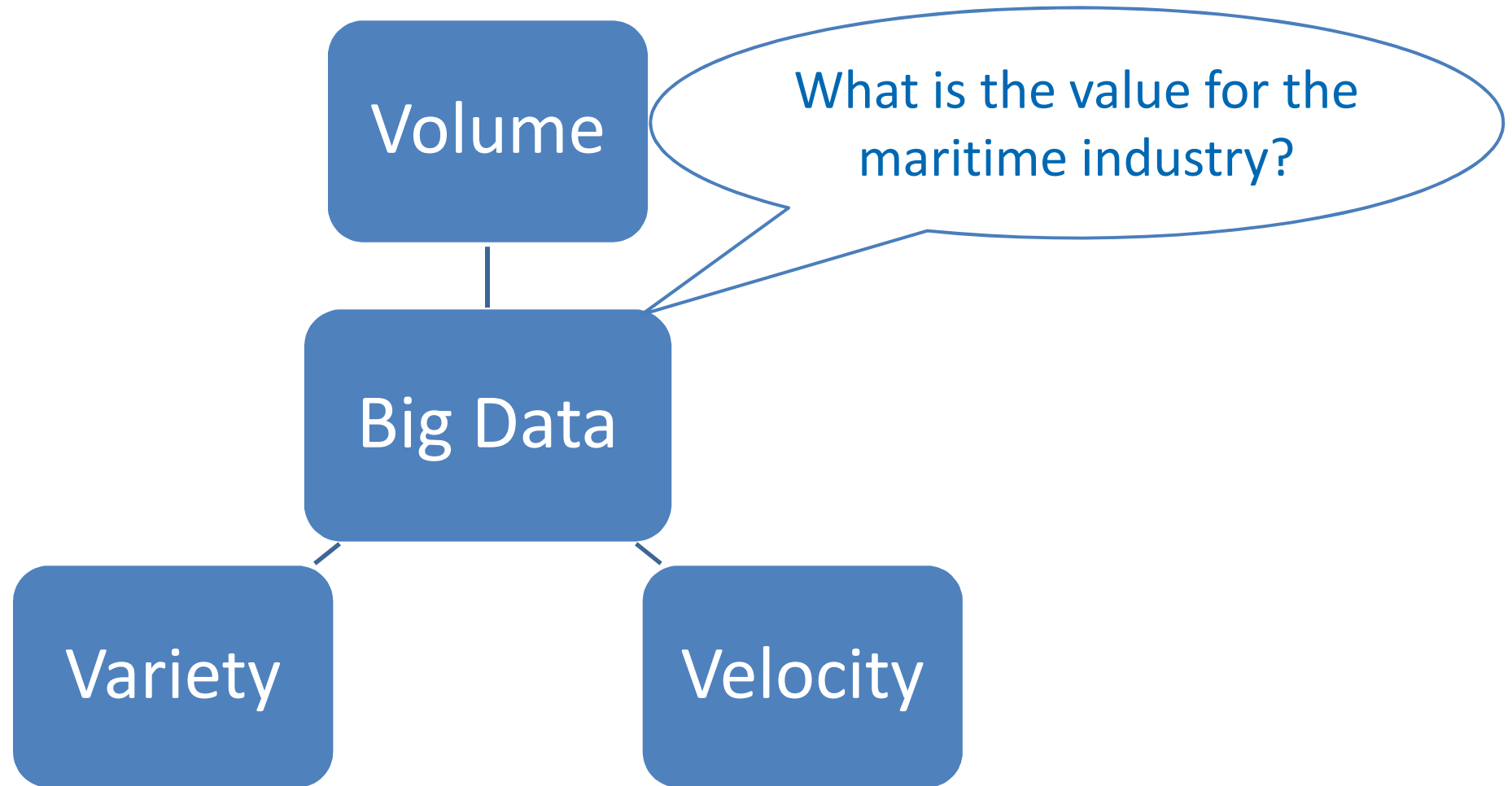


Maritime Big Data Solutions by ClassNK

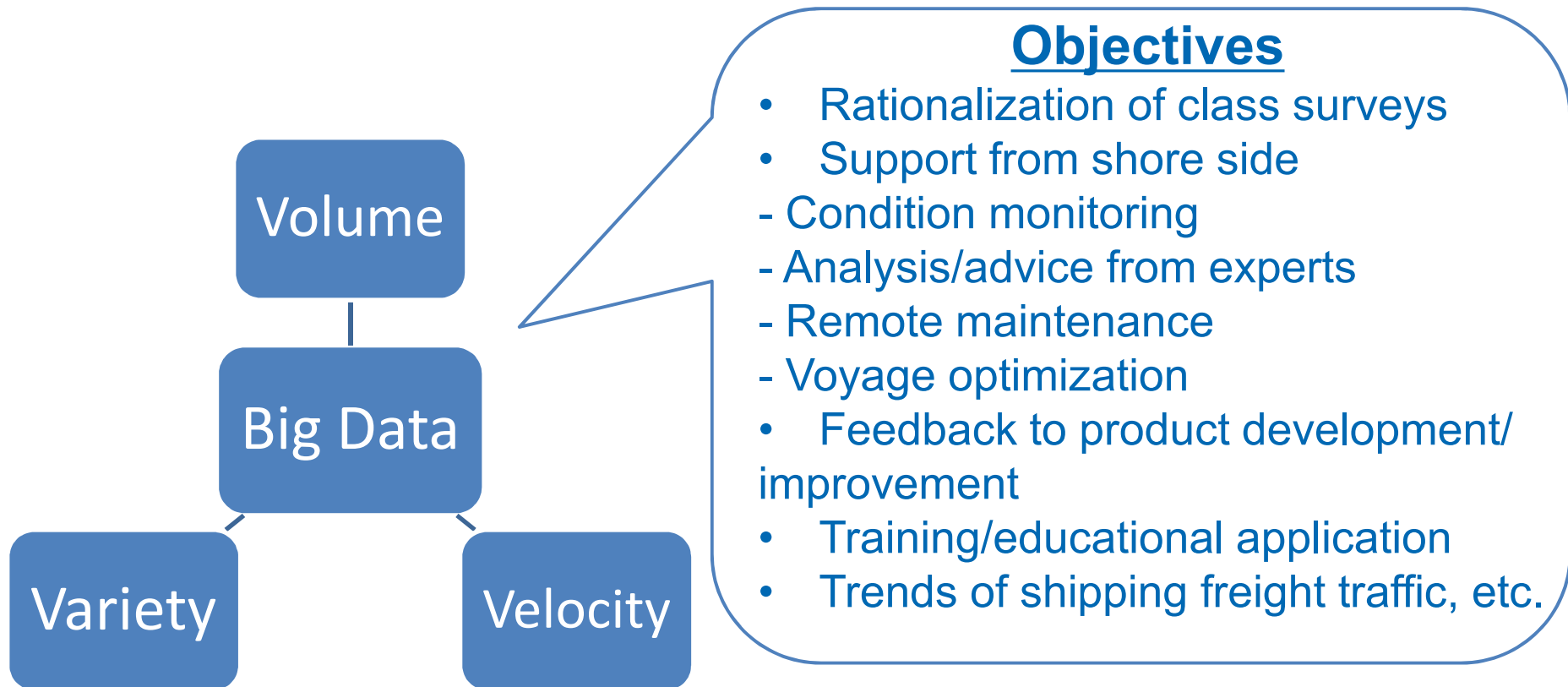


Yasushi Nakamura
Executive Vice President
ClassNK

What is “Big Data”?

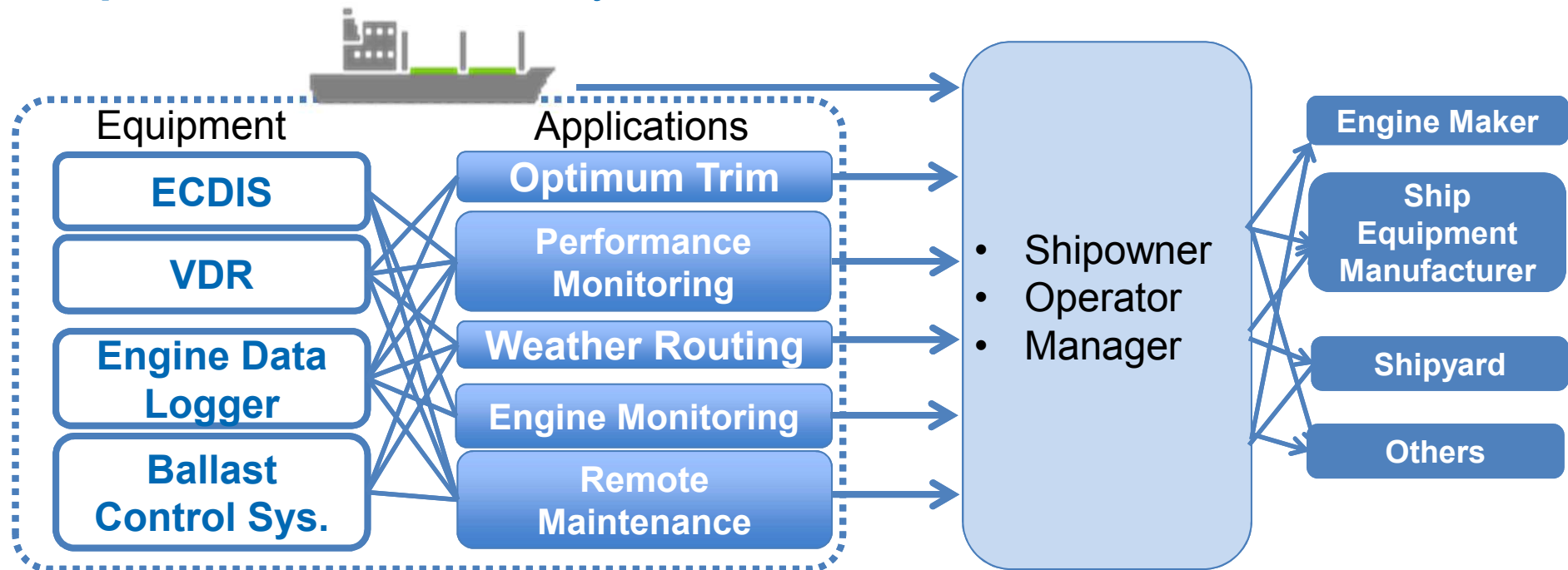


Objectives proposed by ClassNK



Current big data situation:

- We have **huge** amounts of data.
- However, our approach is still **fragmented** and analysis is still largely carried out on a **ship-by-ship** basis.
- To **maximize** the **benefits** of big data, **smart tools** and a **reliable platform** are necessary.



To utilize big data for the maritime industry:

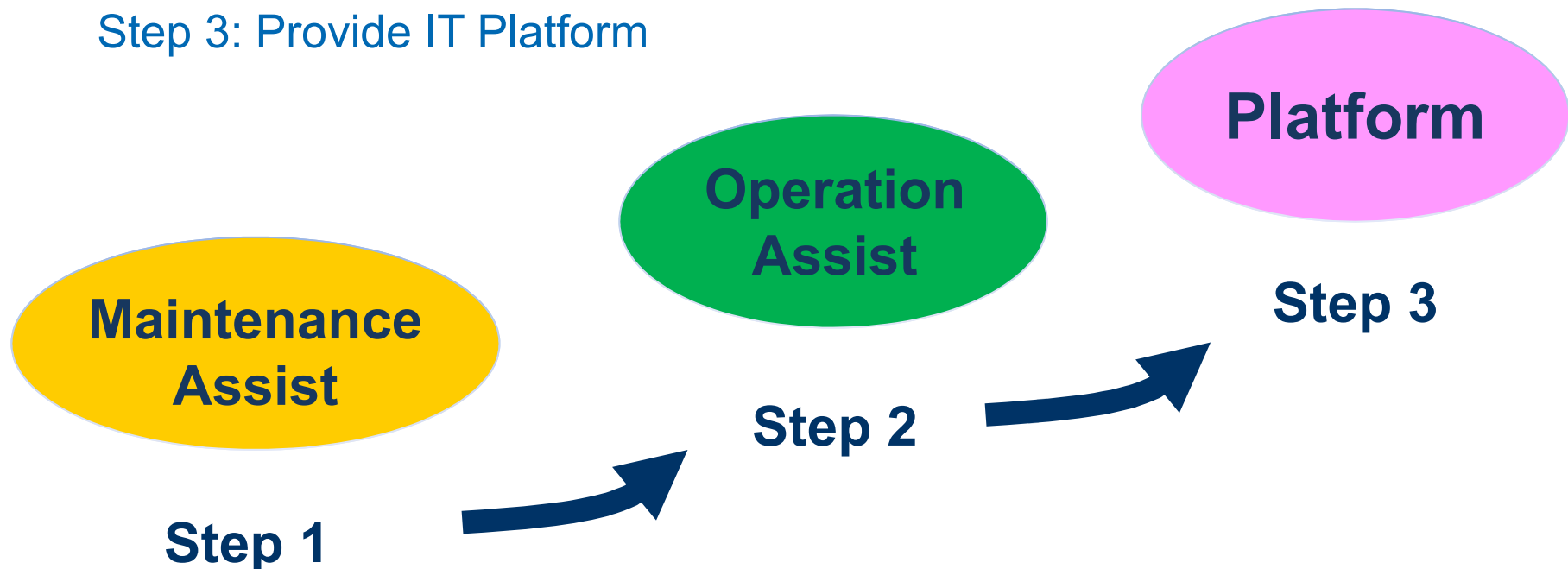
ClassNK's R&D related to big data started in 2009.

Step 1: Upgrade ship safety

Step 2: Assist in ship operations

Step 3: Provide IT Platform

ClassNK
R&D PROJECT



ClassNK have created smart tools for big data utilization

Step 1: Upgrade ship safety

Step 2: Assist in ship operations

Step 3: Provide IT Platform



Condition Monitoring /
Diagnosis System for
Machinery



Step 1

Navigational Support
System



Step 2



Step 3



ClassNK CMAXS

Jointly developed with:



A long time ago, skilled engineers could **hear** engine trouble.

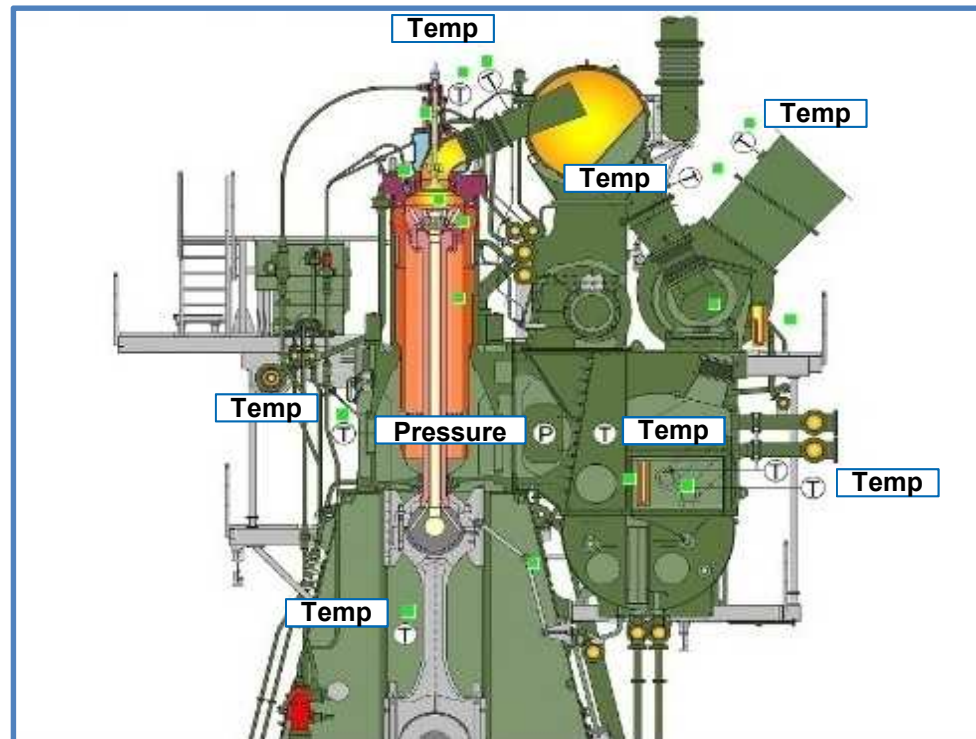


Nowadays, a **shortage** of **skilled engineers**, more **complex machinery** & tightened voyage **schedules** make maintenance more **challenging**.

The industry needed an advanced system **to decrease engine troubles**.

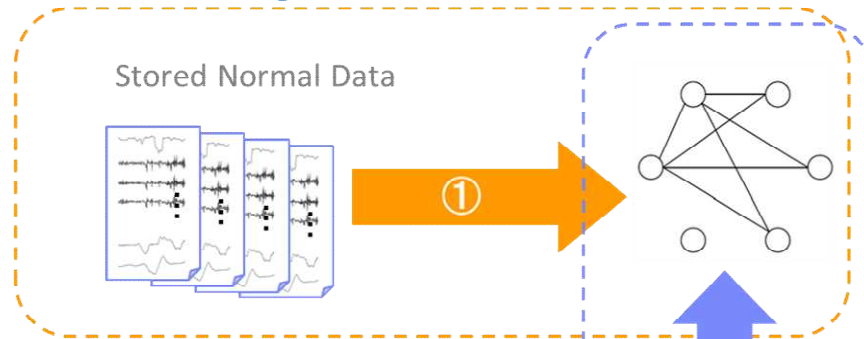
” **How does it work?**

Real-time condition data is collected from **flow, pressure, and temperature** sensors on all engines and pumps in the engine room.

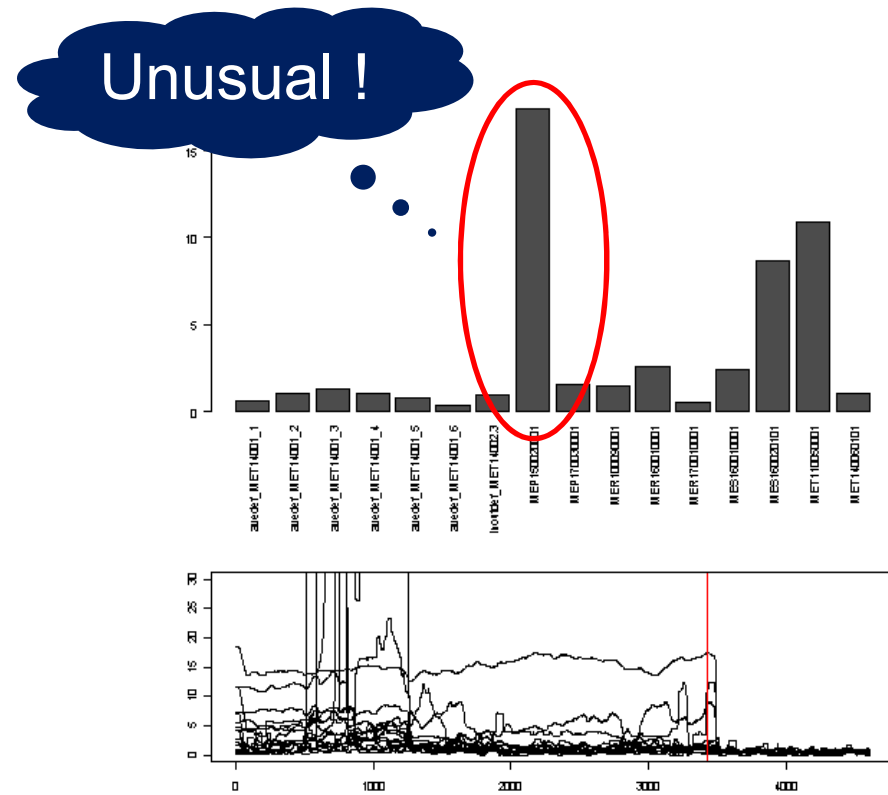
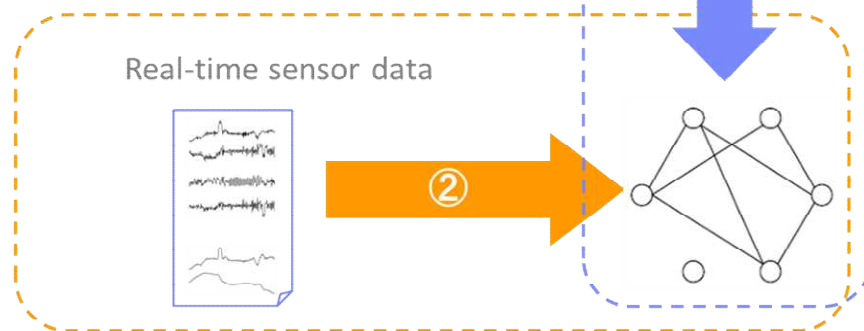


This data is analyzed using **ANACONDA** (Anomaly Analyzer for Correlation Data) software by **IBM**. Then it is translated into **valuable recommendations** that are made accessible to stakeholders shore side and at sea.

Model Building Phase



Runtime



For Optimized Maintenance



**Detects
potential damage**

+



**Minimizes
downtime**

+



**Reduces
repairs**

+



**Simplifies
our surveys**

**Once necessary data is obtained,
these goals can be achieved.**

- ◆ Data from **CMAXS** will be sent to **ShipDC** for even **greater benefits**.
- ◆ Trials on 8 ships completed. Commercial installation on 3 ships underway.



ClassNK-NAPA GREEN

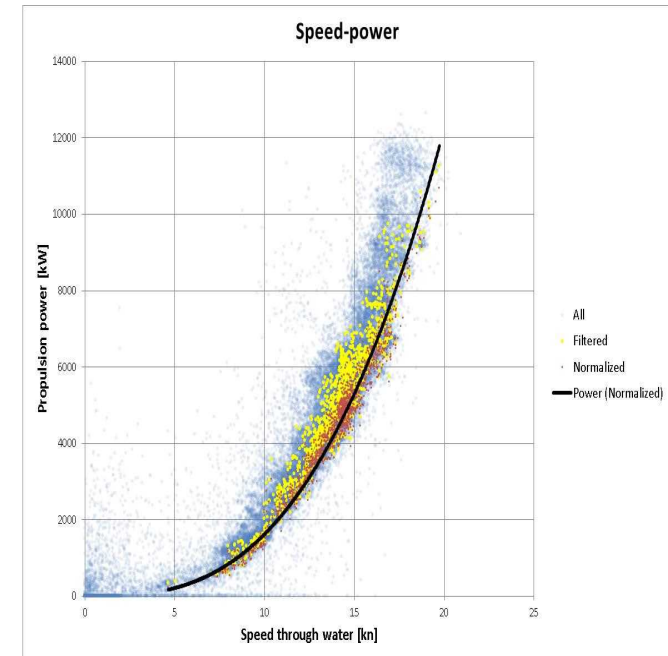
Jointly developed with:



The industry's biggest challenges now include:

- Volatile fuel prices
- Increasingly stringent environmental regulations

In order to overcome these and **optimize operations** whilst remaining **compliant**, accurate voyage analysis is **essential**.

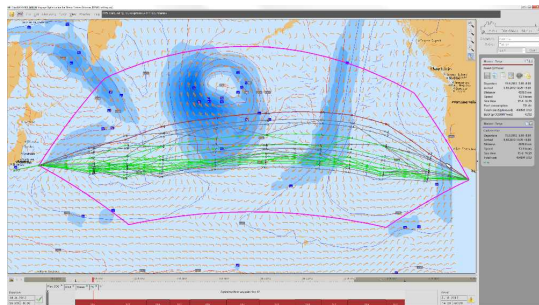


” **How does it work?**

Sensors & software installed on the ship calculate and analyze **fuel consumption, route, speed** and the effects of **weather and trim**, collecting up to **6 million data points** a month to optimize operations and provide feedback to design.

Plan

Trim, speed & route optimization



Monitor

**Real time monitoring
Voyage reporting**



Follow up

**Voyage analysis
Feedback**

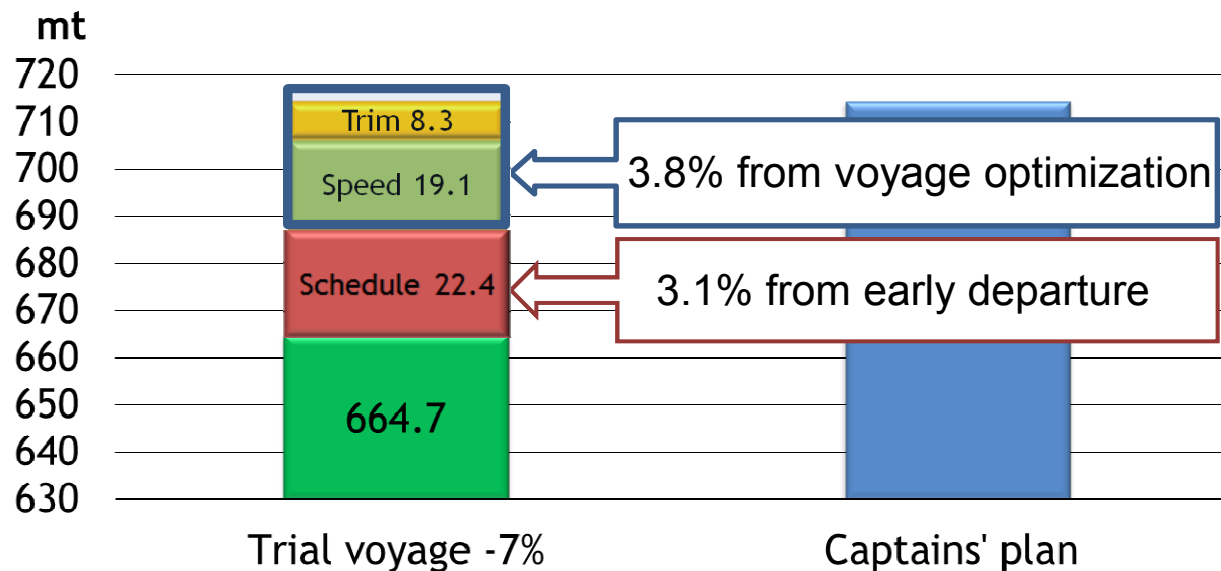


Trial voyage

Fuel savings of **7.0%** have been confirmed by full-scale trials.

- 8,000+ TEU Container Carrier
- A standard Mediterranean/Europe route

Saving breakdown



For Performance Visualization



Forecasts voyage fuel consumption with **99.6% accuracy**



Estimates accurate ETA for **minimizing pocket time**



Provides analysis for better operation and **optimized design**

**Once necessary data is obtained,
these goals can be achieved.**

Currently installed on 67 vessels (as of Jan 2016) including one newbuilding container carrier led by a shipbuilder.

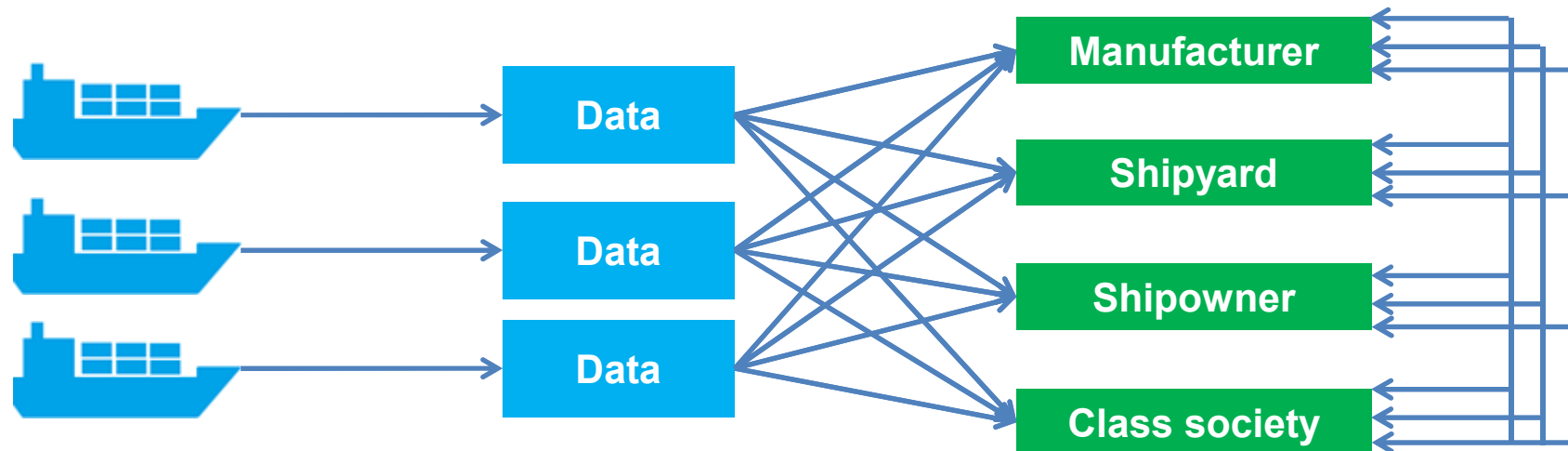
ShipDC

Ship Data Center

Common platform with security and access control

Current situation:

- ◆ We have access to various data.
- ◆ We have multiple applications.
- ◆ However,
 - Ship owners/operators/managers have to handle big data on a ship-by-ship basis.
 - Shipyards/manufacturers have to contact all stakeholders one-by-one.



Common platform with security and access control is necessary.

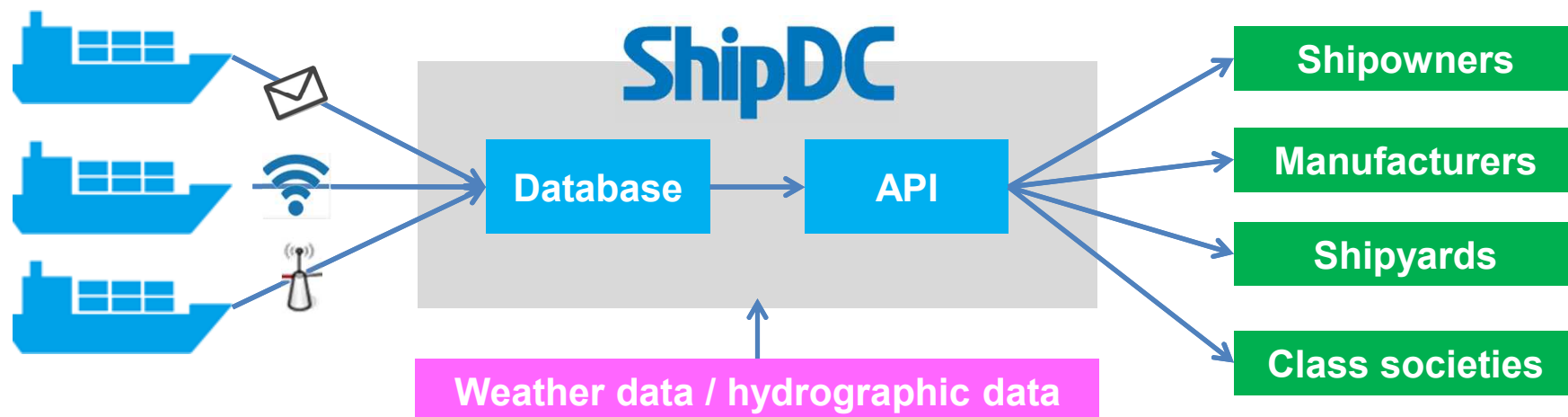
Solutions by ClassNK

Ship Data Center

Company Name	Ship Data Center Co., Ltd.
Head Office	Tokyo
Founded	7 December 2015
Capital	100 million yen
Shareholder	ClassNK (100%)
Services	<ol style="list-style-type: none"> 1. Collecting and accumulating navigational data from ships 2. Supplying the data to its users

” How does it work?

The ship's data file is emailed to the onshore data center. Data is converted & stored using **IBM**'s secure cloud platform. Stored data can only be accessed and utilized according strictly to the requirements set by each company.



- ◆ Trials are currently underway on multiple vessels with full operation of Ship Data Center scheduled for April 2016.

Ship Data Center

ShipDC isn't simply an onshore ship data storage space.

It's a **safe** and **reasonable platform** for the application of ship data, providing the maritime industry with the **IT support** that it needs and promoting the creation of business operations **utilizing big data**.

Shipping companies, shipyards and manufacturers can **safely share** data with complete confidence under **restricted access** conditions.

With the ability to use various data formats, **the opportunities are endless**.

ClassNK supports the wider maritime industry with IoT solutions

ShipDC

- **Improves products and services**
- **Supports compliance with new regulations**
- **Streamlines our surveys**



THANK YOU

for your kind attention