CSR Forum 2016

ClassNK

Eco Ships to Eco Shipping

Dr Abdul Rahim
Managing Director
Europe and Africa

London, 2 November 2016

Needs for eco-technology

ClassNK

2016	2017	2018	2019	2020	2025

Eco-design

セミナーBiZ, http://www.seminar-biz.com/detail/index/2488/33159, 6th May, 2016

EEDI

| Phase 1 | | | | Phase 2 | Phase 3 |

Eco-visualization = Practical-eco

IMO-MRV

EU-MRV

ClassNK's collaborative R&D on Eco Ships
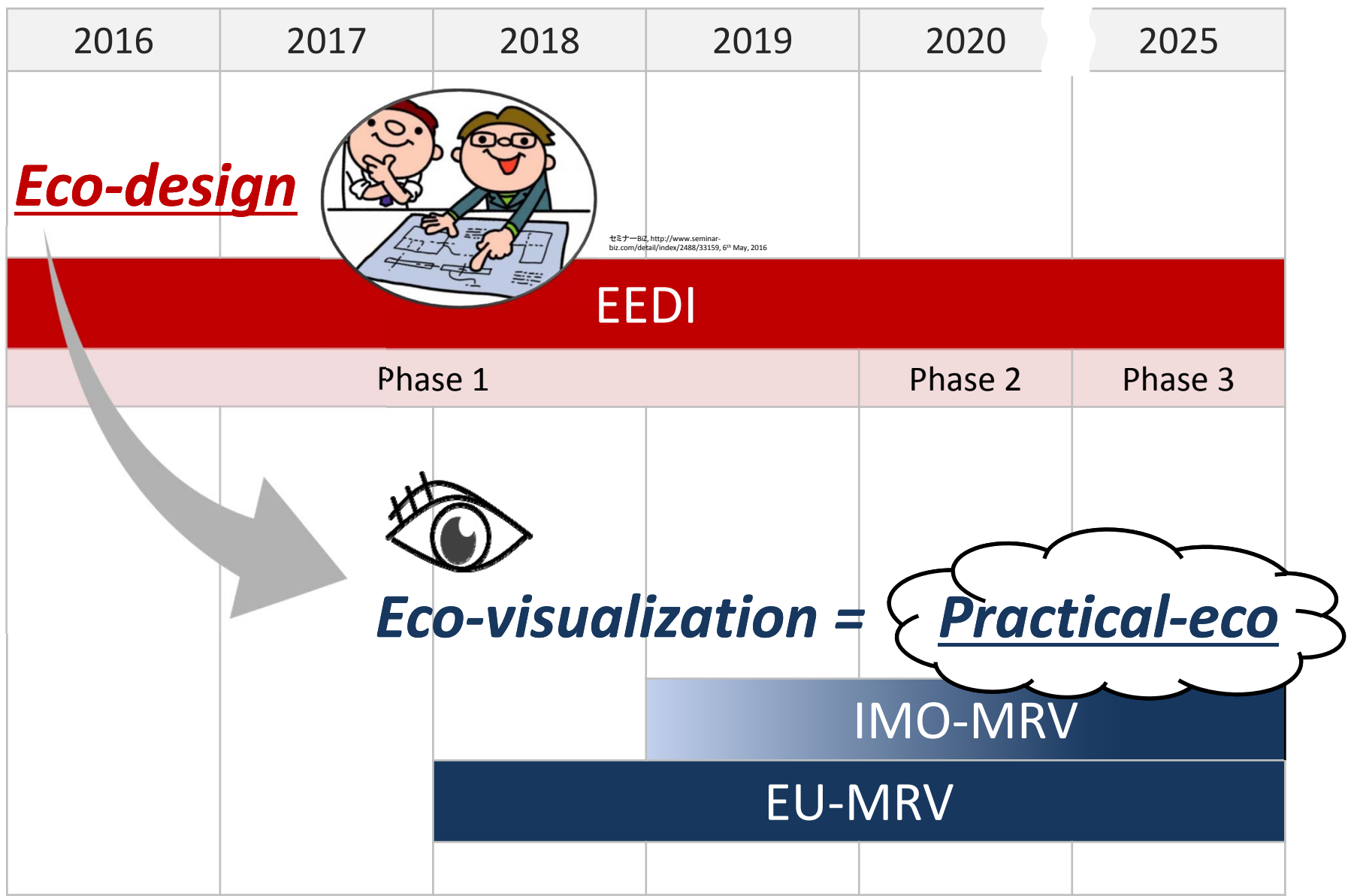
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Japanese National GHG reduction project

Phase 1
2009-2013

Target: **30%** GHG emission reduction

New Engines

Adv. LF Paint

Hybrid T/C

Air Lubrication
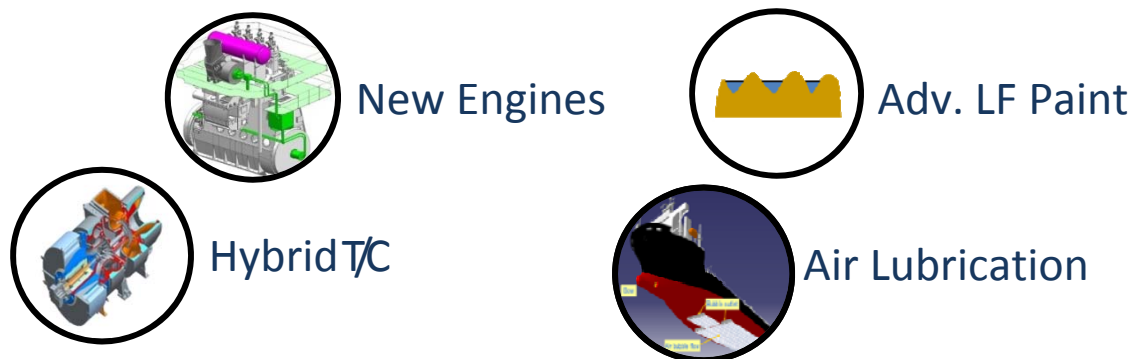
Phase 2
2013-2018

Target: **50%** GHG emission reduction

MLIT initiates 19 R&D Projects

Government

ClassNK
R&D Project

Academia

Industry

Practical eco-solutions born in ClassNK's R&D

Eco-focus:

I. Hull resistance

II. Propulsive efficiency

III. Engine plant

IV. Renewable energy

KOBELCO, http://www.kobelco.co.jp/notices/2015/1192742_15365.html, 6th May, 2016

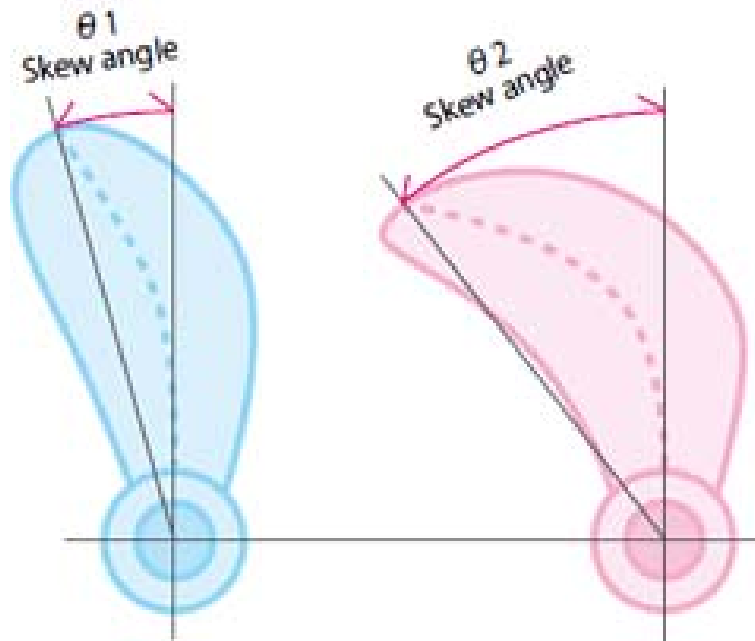## Focus I : Hull resistance

Water trapping technology
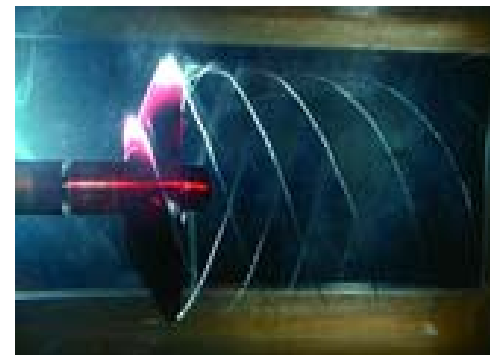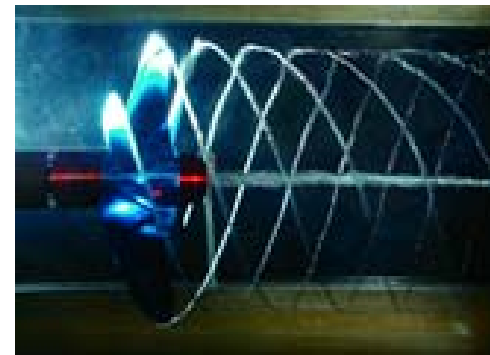

Conventional → Water trapping
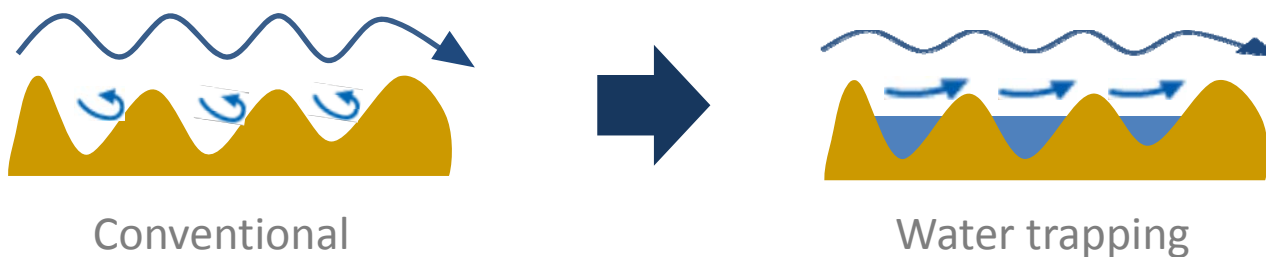
✓ Reduces CO_2 emission up to 10%

✓ Already applied to 540 vessels

Focus II: Propulsive efficiency

"Designing" approach has been taken so far.

High skew

Non - hub vortex

Nakashima Propeller, http://www.nakashima.co.jp/product/fpp.html, 9th May 2016

Focus II: Propulsive efficiency

Our new approach from "Material" view point

CFRP propeller

- Ultra light → Enlarged diameter
- Flexible → Low vibration

Nakashima Propeller, NYK, MTI, NMRI, Imabari Shipbuilding, The University of Tokyo

Focus II: Propulsive efficiency

✓ Improved propulsive efficiency by 6%

✓ Lowered onboard vibration & noise
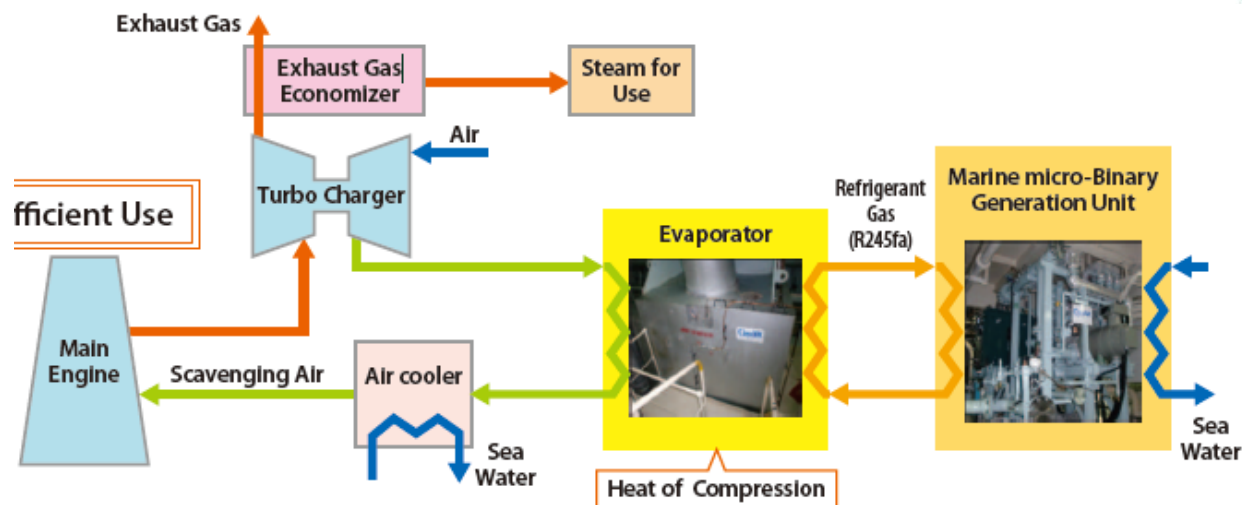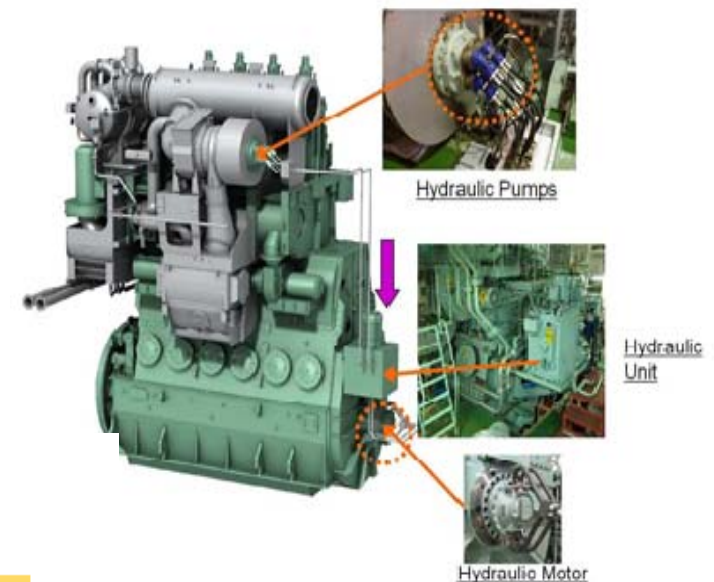

MV Taiko Maru

ClassNK

Focus III: Engine plant

Major eco-resources (engine efficiency, high temperature exhaust heat, …) have been utilized.

Binary power generation

Reuse low temperature waste heat energy for power generation.

Focus IV: Renewable energy

MOL, http://www.mol.co.jp/pr/2012/12043.html, 9th May, 2016

Solar power

Wind power

ClassNK

K-Line "Drive Green Highway" : 7,500 PCTC

Solar power generation

Lower wind resistance

SOx scrubber

Low-friction paint

Bulb fin

EGR ＋ Water emulsion ＋ T/C Cut

K-Line, http://www.kline.co.jp/news/detail/1203978_1454.html, 6th May, 2016

Combination of eco-devices is the current field of competition. This also intimates the limit of hardware R&D.

K-Line, http://www.kline.co.jp/news/detail/1203978_1454.html, 6th May, 2016

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The trend is shifting to software R&D.
Maritime IoT is promoted rapidly.

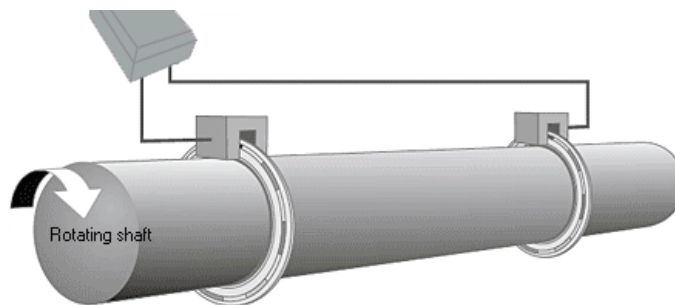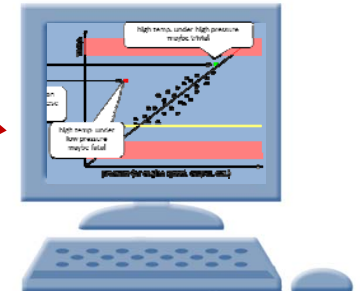K-Line, http://www.kline.co.jp/news/detail/1203978_1454.html, 6th May, 2016

K-Line, https://www.khi.co.jp/rd/tech/154/nj154ts01.html, 6th May, 2016
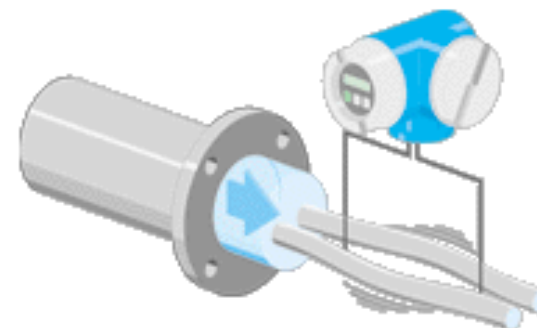
Voyage support system

What should be prepared?

IoT-ready newbuildings,
i.e, select recommended equipment & arrangement.

➡ Save excessive cost for software installation and
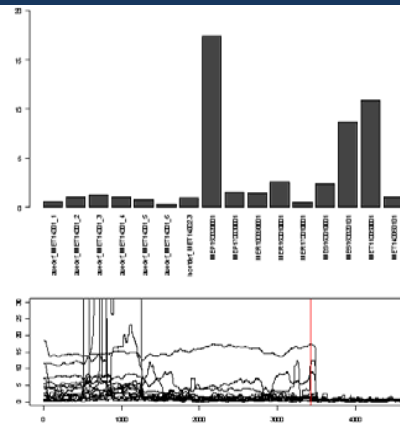make the best of IoT solutions.

Torque meter

FO flow meter

Eco-ship to eco-shipping — ClassNK

How do we use it?

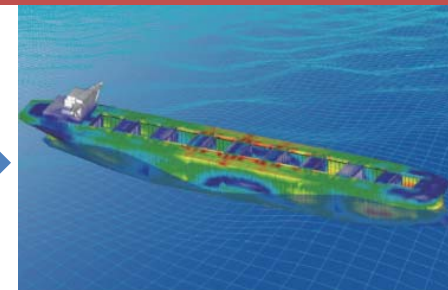IoT reveals actual ship performance and encourages us to feed them back to designing.

Onboard data collection → Big data analysis → Follow up

ClassNK's software tools are shaping the future of Smart and Compliant Shipping

Efficiency

Regulation

Optimization

Our tools in service

Databases and Data Centre

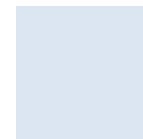| Tool	Purpose
ClassNK Archive Center	**For SOLAS document storage**
PrimeShip GREEN/SRM	**For IHM development**
ShipDC	**For big data utilization**
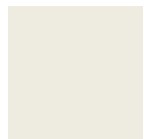
☐ = Document support tool   ☐ = Big data tool

GBS-SCF (Goal-based standards Ship Construction File)

◆ SOLAS requires SCFs to comply with GBS for *design transparency*

Current SCF	New GBS-SCF to prepare plans
• General arrangement	• Areas prone to excessive corrosion
• Key plan	• Areas prone to yielding/buckling etc.
• Capacity plan	
• Coating technical file	**Newly required to be kept onboard**
• Operation manual for hatch cover	• **Lines**
• Access manual	• **Yard plan**
• Gas hazardous area	• **Detailed structural calculations**

◆ GBS-SCF will be mandatory for oil tankers and bulk carriers contracted on or after 1 July 2016, or constructed (keel-laying) on or after 1 July 2017 that are 150 meters or more in length.

In principle the SCF is to be kept onboard, but considering intellectual property rights, some documents such as lines, yard plan etc. can be stored in an onshore archive center.
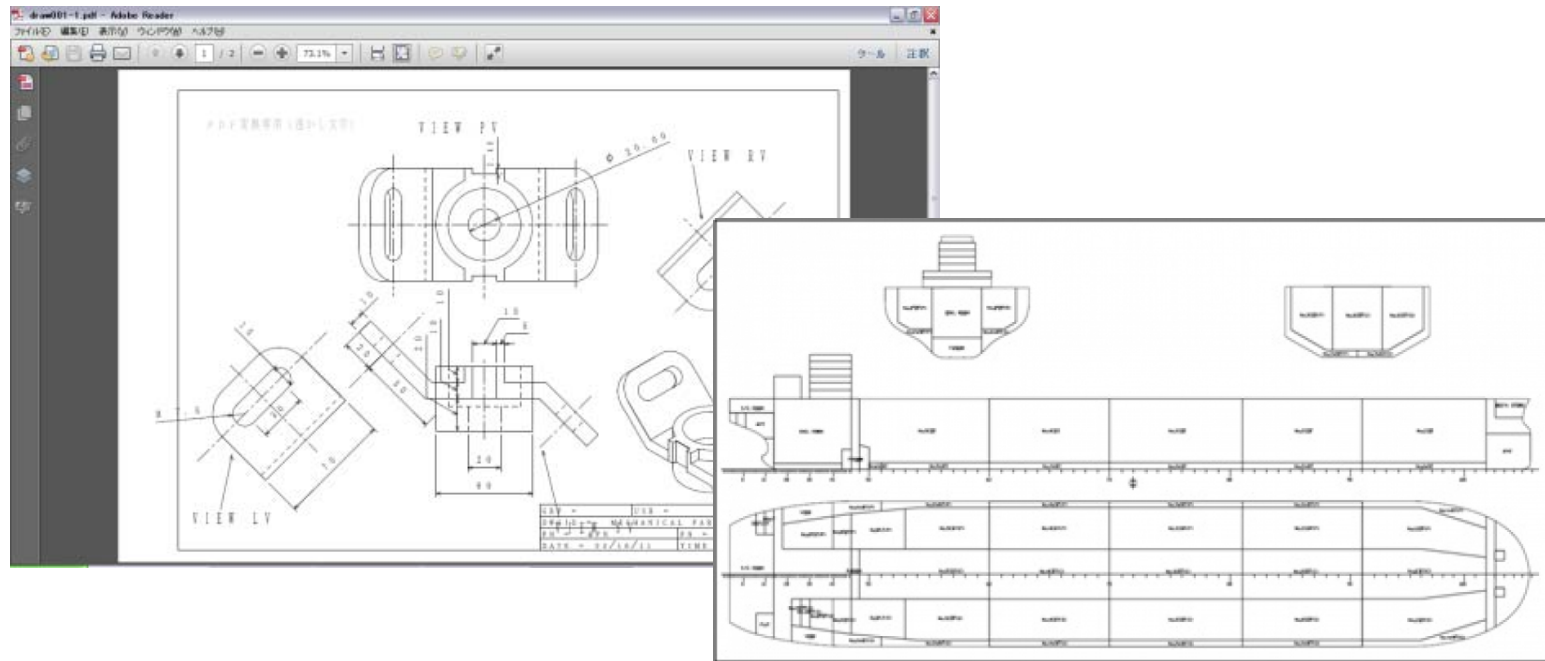
A **secure system** was necessary in order to **protect intellectual property(IP)** whilst maintaining **compliance**.

Overview of ClassNK Archive Center

ClassNK Archive Center

IP Level
Ordinary

IP Level
High

IP Holders
- Shipyard -

SCF Registration

IP Holder's Permission

Return and Disposal

Delivery of SCF media

Browsing / Printing SCF

SCF Holders
- Owners / Management Companies -

Disclosure Request

Delivery of Drawing

Return and Disposal

On board

SCF media onboard

High IP Drawing
● Lines
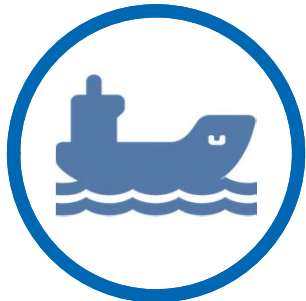● Yard Plan, etc.
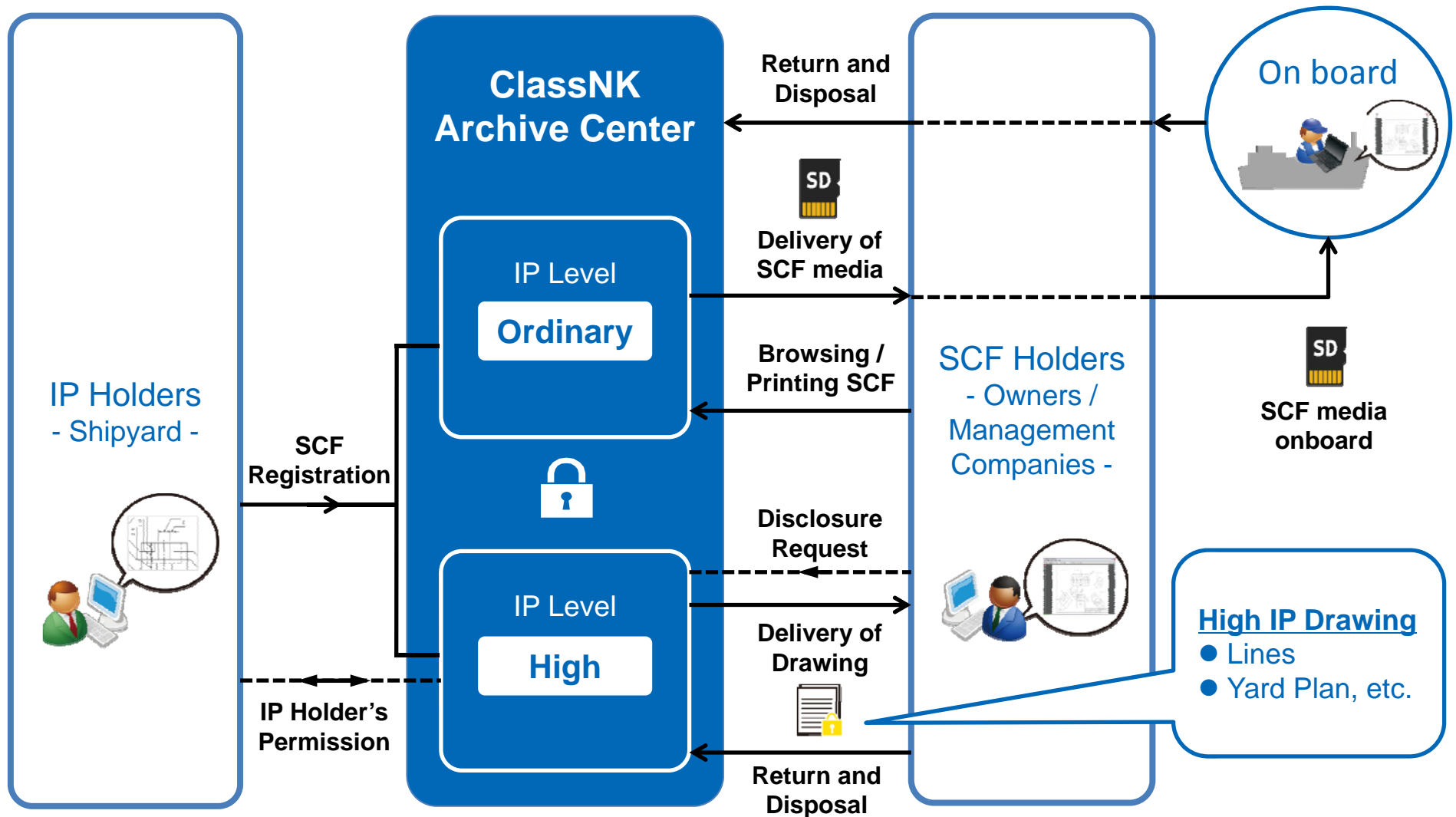
For smart, secure GBS-SCF storage

- GBS-SCF storage, view, and delivery **compliant** with regulations and industry requirements
- As-built data storage

Can be used for **any ship** regardless of class

Adequate **security control** providing both IP protection and convenience to users

Inventory of Hazardous Materials (IHM)

- Location and quantity of hazardous materials on board

◆ **Ship Recycling Convention**
  ➢ Mandatory for ships ＞500GT engaged in international voyages after entry into force

◆ **EU Regulation on Ship Recycling**
  ➢ Mandatory for ships ＞500GT entering EU waters from 31 December 2020

In order to develop an IHM, shipbuilders need to collect large amounts of hazardous material information from suppliers. Doing this using **traditional methods is very inefficient.**
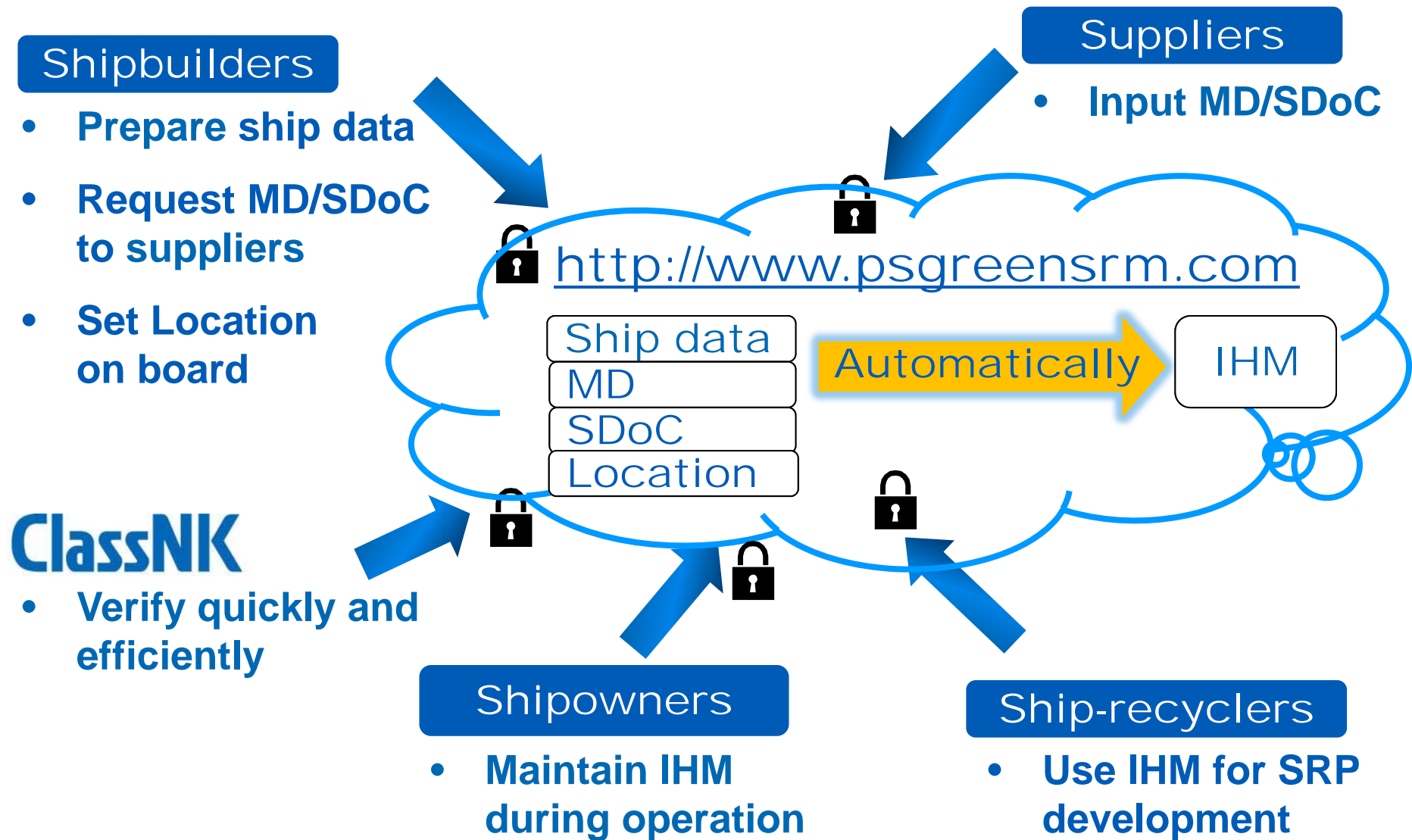
Time-consuming. Hundred of hours per vessel.

Exceeds several thousand pages per vessel.

Needs to be shared manually between multiple parties.

Shipbuilders
- Prepare ship data
- Request MD/SDoC to suppliers
- Set Location on board

Suppliers
- Input MD/SDoC

http://www.psgreensrm.com

| Ship data |
| MD |
| SDoC |
| Location |

Automatically → IHM

ClassNK
- Verify quickly and efficiently

Shipowners
- Maintain IHM during operation

Ship-recyclers
- Use IHM for SRP development

For efficient IHM development

Slashes required man hours by **up to 90%.**

Can be used for **any ship** regardless of type, size, location or class.

De facto standard in East Asia and is increasingly recognized worldwide.

◆ **Free of Charge** and about **2,500 registered companies**

◆ In 2015, 28% of new ships registered in ClassNK were delivered with IHMs made using SRM, despite the Ship Recycling Convention not yet coming into effect.

Current big data situation:

We have access to a wealth of data. However, our approach to data capture and transmission is still very fragmented with similar data being sent to several vendors and analysis still being carried out almost entirely on a ship-by-ship basis.
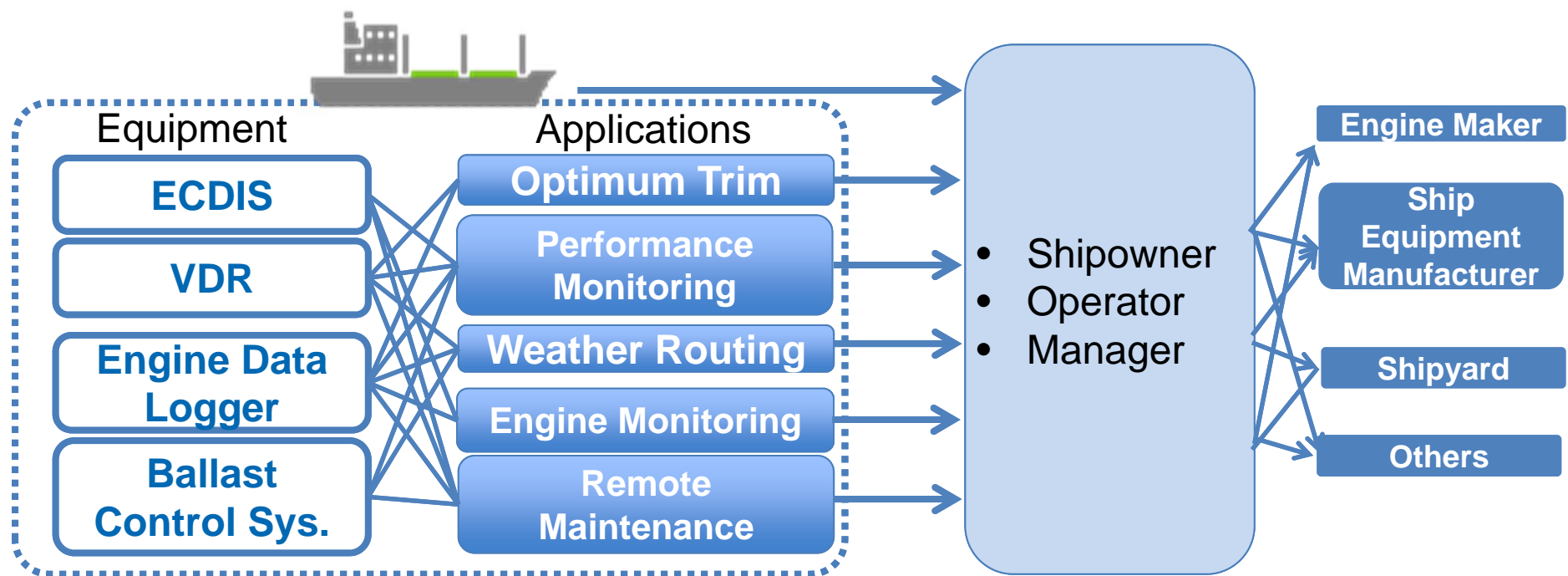
Ship Data Center

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**.

" 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.
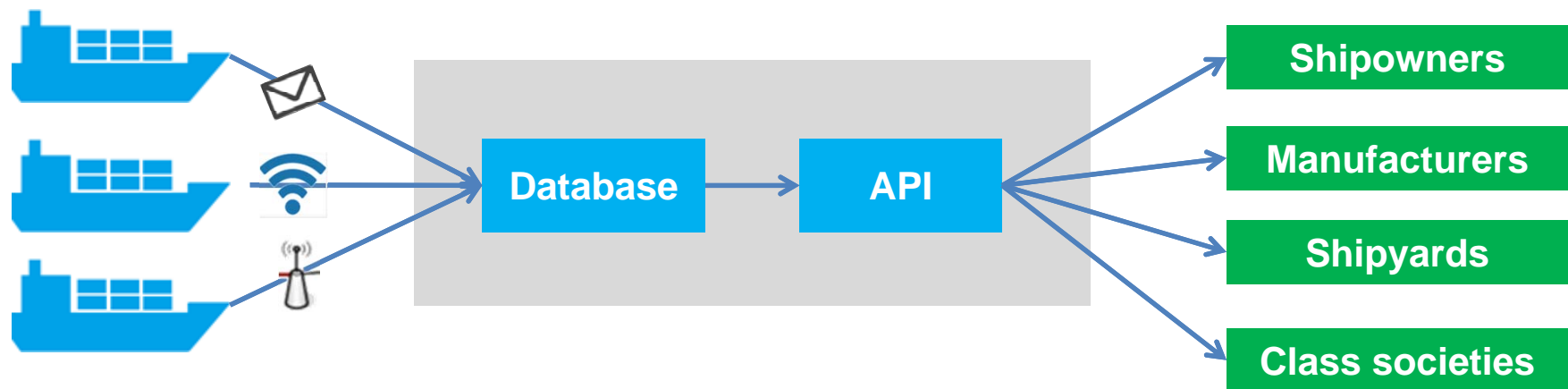
◆ Ship Data Center has begun operations since April 2016.

Supporting the wider maritime industry

Improves products and services

Supports EU MRV compliance

Streamlines our surveys

K Line, MLIT, ClassNK

https://www.kline.co.jp/en/movie/1203779_2645.html

- Installation of low NOx emission engine by Kawasaki
  (water emulsion fuel & exhaust gas recirculation)
- Installation of SOx scrubber by Mitsubishi Kakoki
  (large scale exhaust gas washing system)
- Adoption of many energy saving technologies