Activities of Smart Ship Application Platform (SSAP) Project

Dr. Hideyuki Ando

Director, MTI (NYK Group)
Chairman, Smart Ship Application Platform 3 (SSAP3) Project

Outline

1. **Introduction of SSAP**
2. Open platform concept
3. Proposed standards ISO 19847 & 19848
4. Current activities in SSAP3
    1. Revision of ISO 19847, 19848 & 16425
    2. Proposal of ISO NP 23807
5. Summary

Background

- Onboard and ashore IoT application services, which relies on ship onboard equipment data, have become prevalent.
  - Weather routing
  - Optimum trim
  - Performance monitoring
  - Engine monitoring
  - Condition monitoring
  - Power plant energy management
  - Remote maintenance

Smart Ship and SSAP

- The concept of Smart Ship is to utilize IoT application services to achieve optimum ship operation in terms of safety and energy efficiency

- The target of SSAP project is to support these IoT application services to access ship equipment data easily and enhance more application services development

IoT applications in marine industry

Target

- Prevent unpredicted downtime
- Reduce maintenance cost
- Energy efficiency in operation

Measure

- Condition monitoring
- Big data analysis
- Support service engineer
- Intelligent machinery
  - Self diagnostics

Working style will be changed

IoT and Big data applications

Role	Function	Example of IoT and Big data application
Ship owner	**Technical management**	• Safety operation • Condition monitoring & maintenance • Environmental regulation compliance • Hull & propeller cleaning • Retrofit & modification
	New building	• Design optimization
Ship operator	**Operation**	• Energy saving operation • Safe operation • Schedule management
	Fleet planning	• Fleet allocation • Service planning • Chartering

Other partners in value chains, such as cargo owners, shipyards, manufacturers, class societies, have also interests in ship Big data. With acceptance of IoT data owner, normally ship owner, Ship IoT will become prevalent.

SSAP Project (Dec 2012 – Mar 2015)

- Participants
  - Members: 27 organizations
  - Observers: 9 organizations

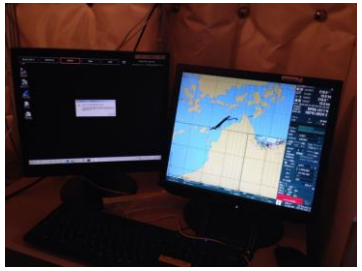
- Joint Industry Project (JIP) supported by JSMEA + Class NK

- Achievements
  - Design specification of shipboard data server
  - Implementation of shipboard data server and trials on 2 domestic vessels
  - Ship – shore open platform design for ship IoT
  - Proposed 2 ISO NPs (ISO NP19847 / ISO NP19848)

Onboard trials in SSAP (2014)

RORO Ferry
SUNFLOWER SHIRETOKO

Crude-Oil Tanker
SHINKYOKUTO MARU



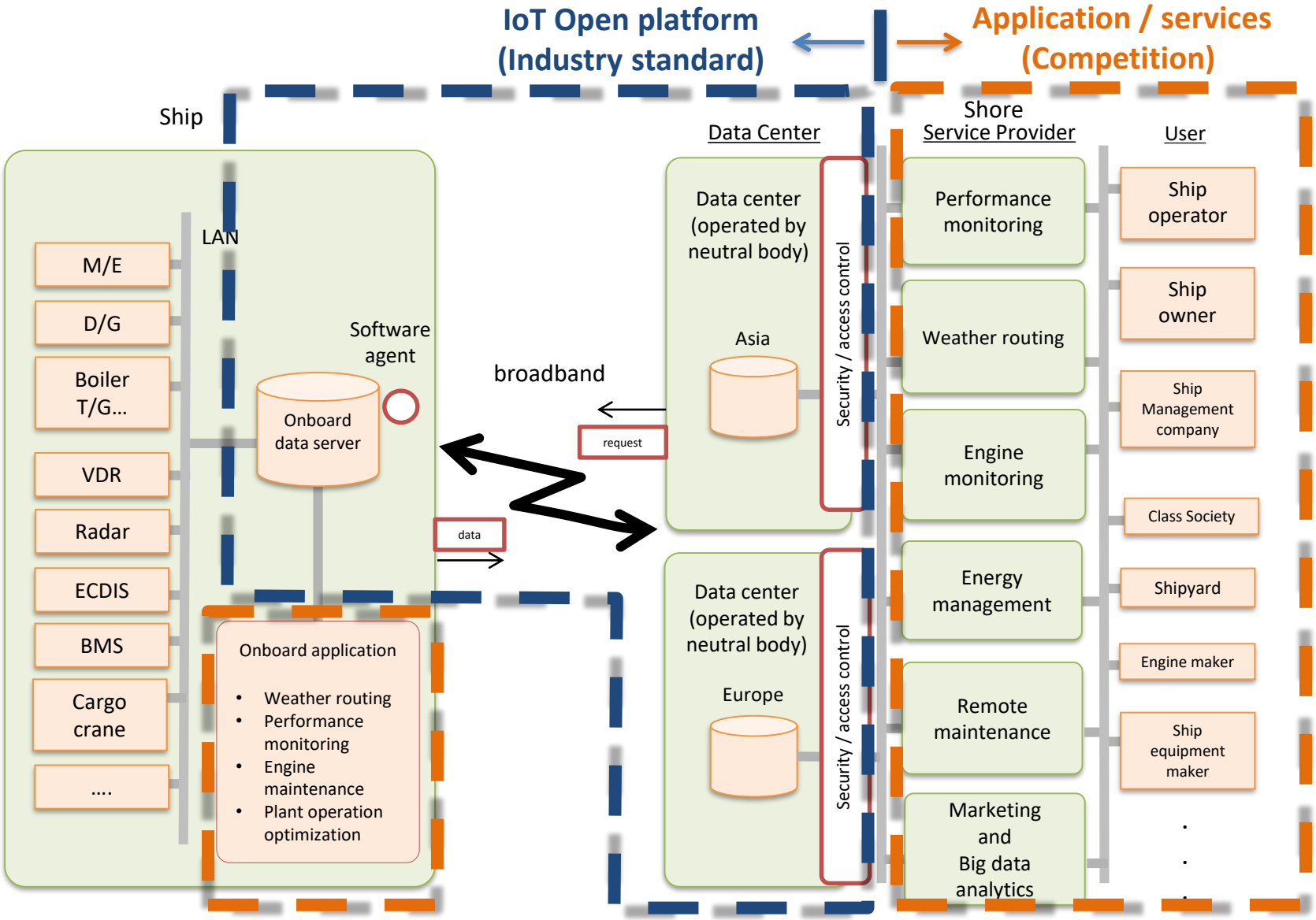
SSAP2 Project
(Smart Ship Application Platform 2 Project)

- Participants
  - 34 members + 9 observers
- Schedule
  - Aug. 2015 – Oct. 2018
- Action items
  1. Promotion of SSAP2 concept
  2. System design and prototyping of SSAP2
  3. Standardization – ISO CD19847/CD19848
  4. Public relations

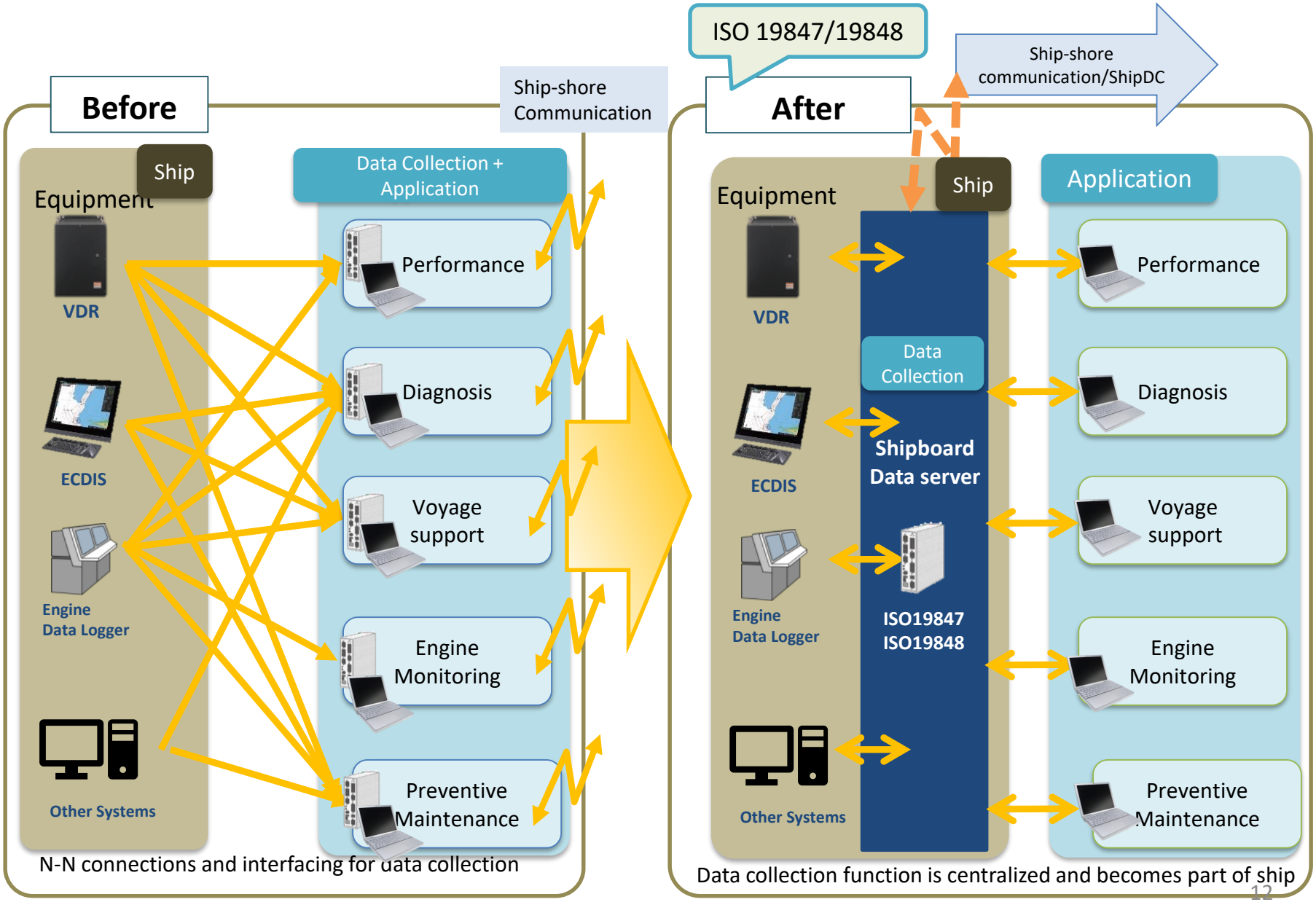
Outline

1. Introduction of SSAP
2. **Open platform concept**
3. Proposed standards ISO 19847 & 19848
4. Current activities in SSAP3
    1. Revision of ISO 19847, 19848 & 16425
    2. Proposal of ISO NP 23807
5. Summary

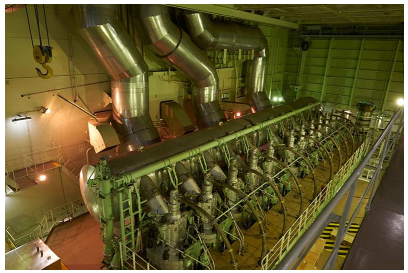
Open platform for data sharing in maritime industry



Role of shipboard data server (ISO19847 &19848)



Use case scenario images of open platform



Shipping
- Safety operation
- Vessel performance analysis
- Fleet operation optimization
- Weather routing

Shipyard
- In-service performance analysis of delivered ships
- Feedback to new ship design

Manufacturer
- Remote condition monitoring
- Remote diagnostics
- After service support

Class Society
- Utilization in class inspection

Insurance
- New services

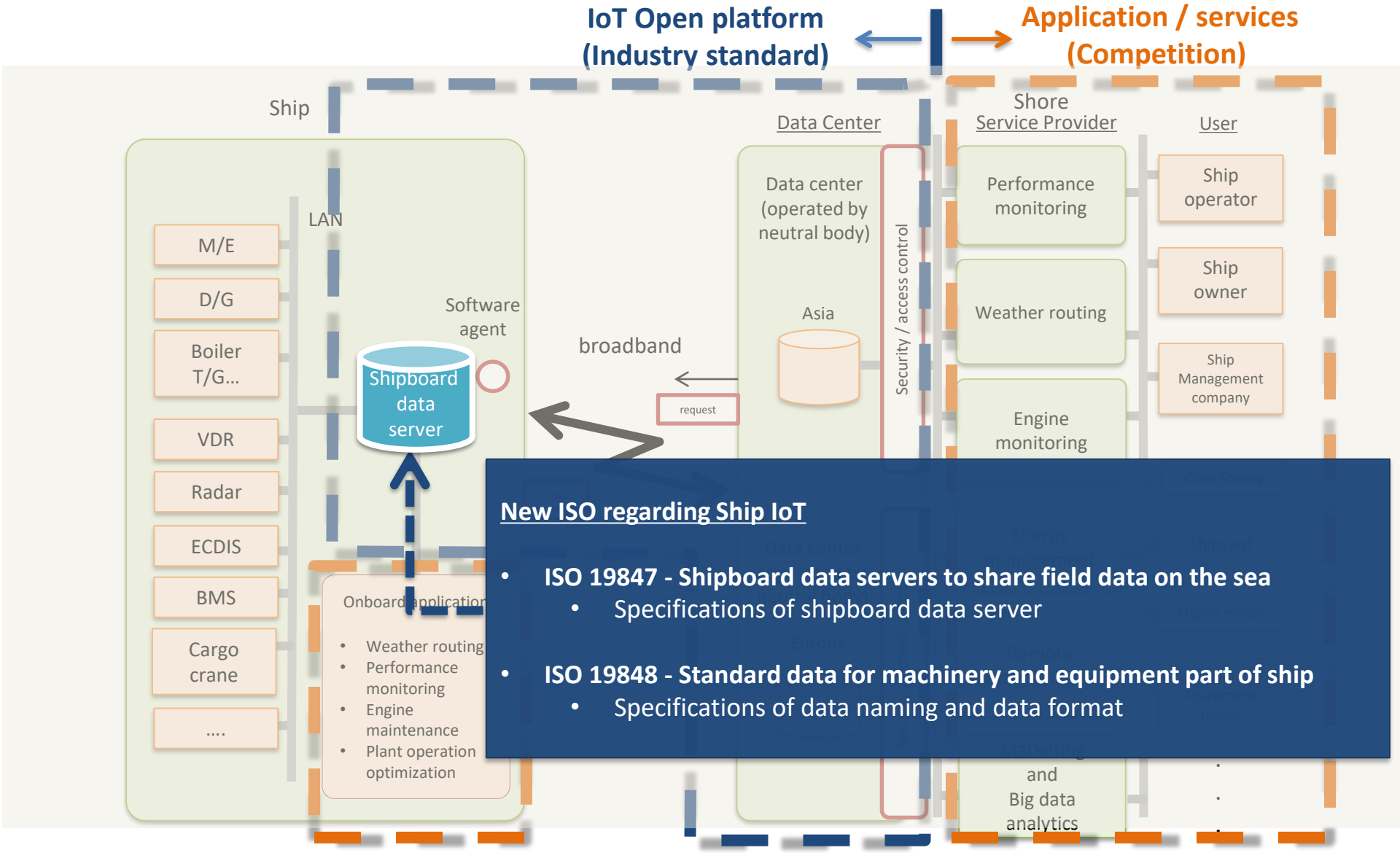
Regulatory use
- Data reporting

Data sharing in the maritime industry

Outline

1. Introduction of SSAP
2. Open platform concept
3. **Proposed standards ISO 19847 & 19848**
4. Current activities in SSAP3
    1. Revision of ISO 19847, 19848 & 16425
    2. Proposal of ISO NP 23807
5. Summary

Open platform for data sharing in maritime industry



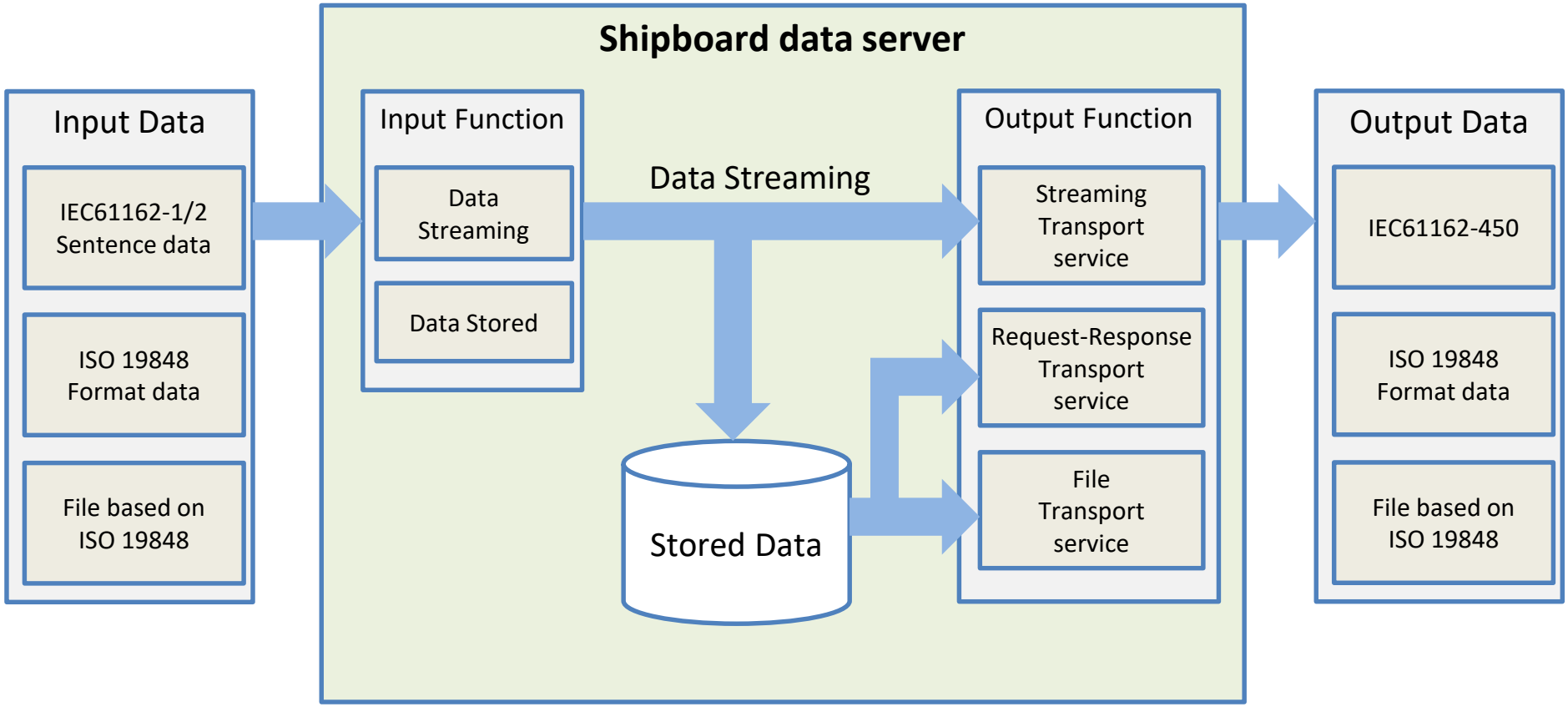
New ISO regarding Ship IoT

- **ISO 19847 - Shipboard data servers to share field data on the sea**
  - Specifications of shipboard data server
- **ISO 19848 - Standard data for machinery and equipment part of ship**
  - Specifications of data naming and data format

ISO 19847

Shipboard data servers to share field data on the sea

Specifications of shipboard data server



Standard Codebook and Standard ID
ISO 19848

Standard data for machinery and equipment of ship

Standard

- Standard naming structure
  - URL style hierarchical ID
  - Globally ID consists of naming entity, ship ID and Local ID
- Codebook
  - Multiple naming rules can be applied to allow domain diversity
  - Naming rule defines how to compose Local ID
- Standard ID
  - Standard ID can be defined for interoperability and data catalogues

Outline

1. Introduction of SSAP
2. Open platform concept
3. Proposed standards ISO 19847 & 19848
4. **Current activities in SSAP3**
    1. Revision of ISO 19847, 19848 & 16425
    2. Proposal of ISO NP 23807
5. Summary

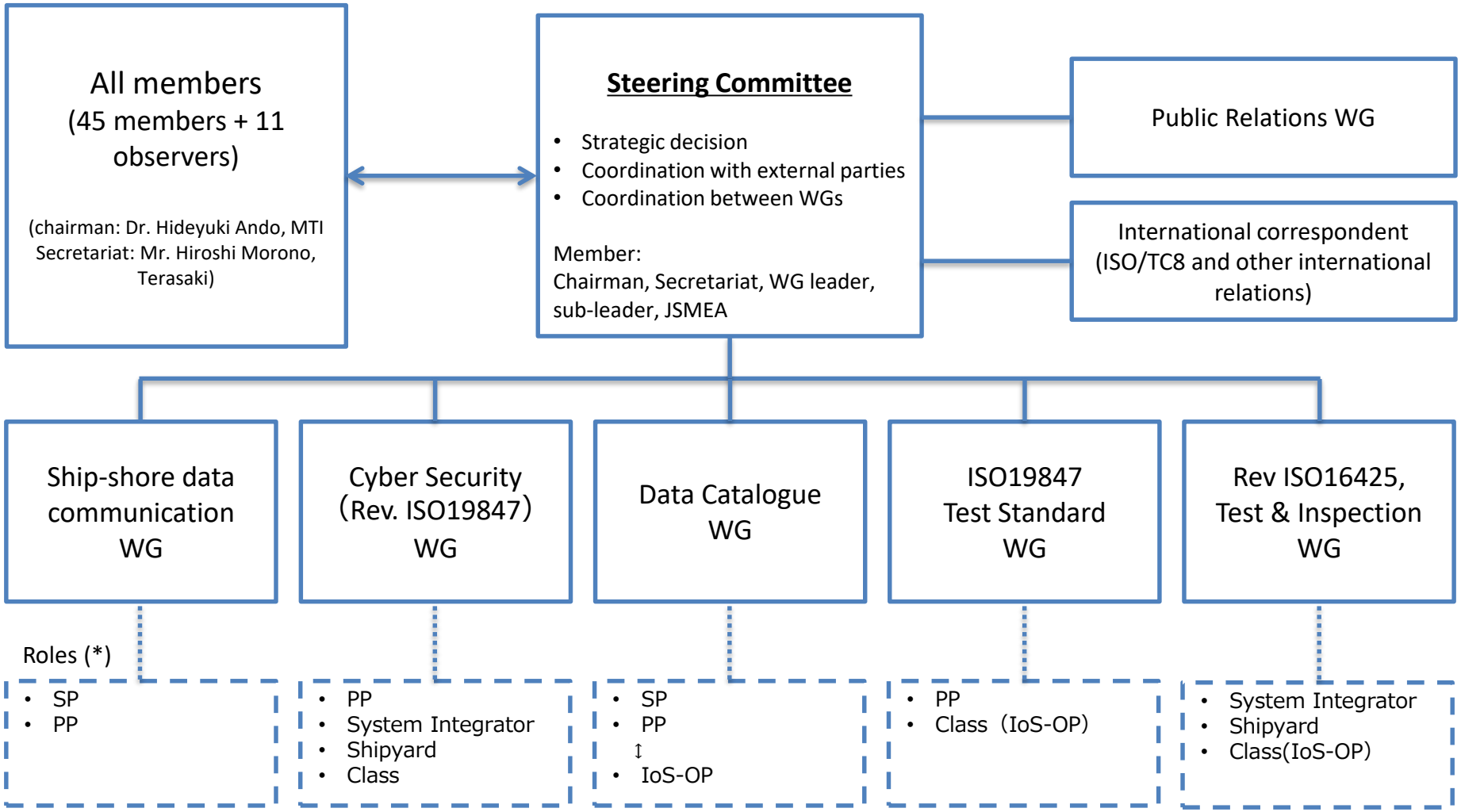
SSAP3 Project (Oct 2018 – Sep 2020)

- Participants
  - 45 members
  - 11 observers

- Joint Industry Project (JIP)
  - JSMEA + ClassNK

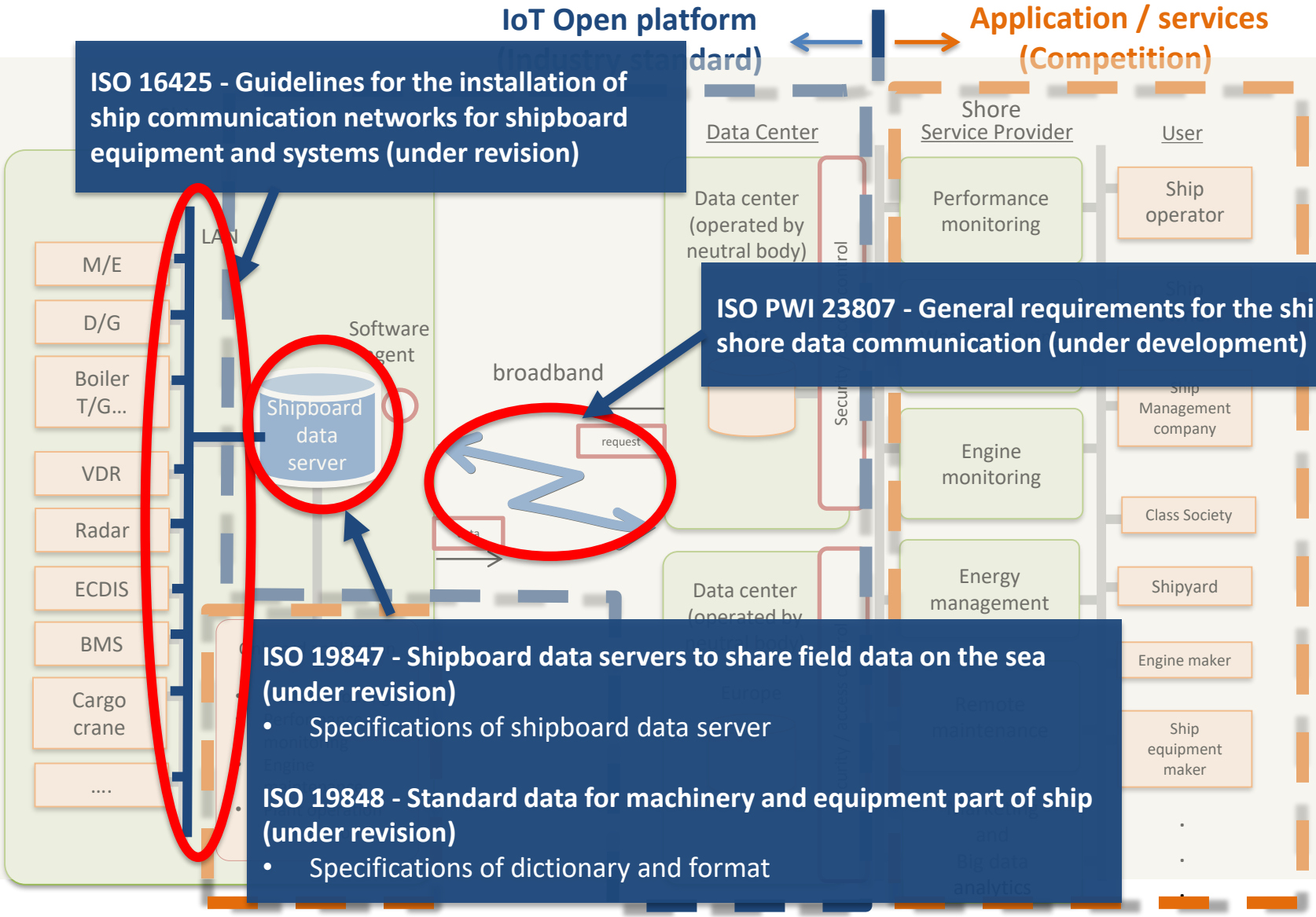
- Action items (WG)
  - Ship-shore data communication for ISO 23807 (WG1)
  - Cyber security for ISO 19847 (WG2)
  - Data catalogue (WG3)
  - Test methods of ISO 19847 (WG4)
  - Test & inspection methods of ISO 16425 (WG5)
  - Public relations

Organization of SSAP3 Project



* SP: Solution Provider, PP: Platform Provider
Definition in IoS-OP Consortium

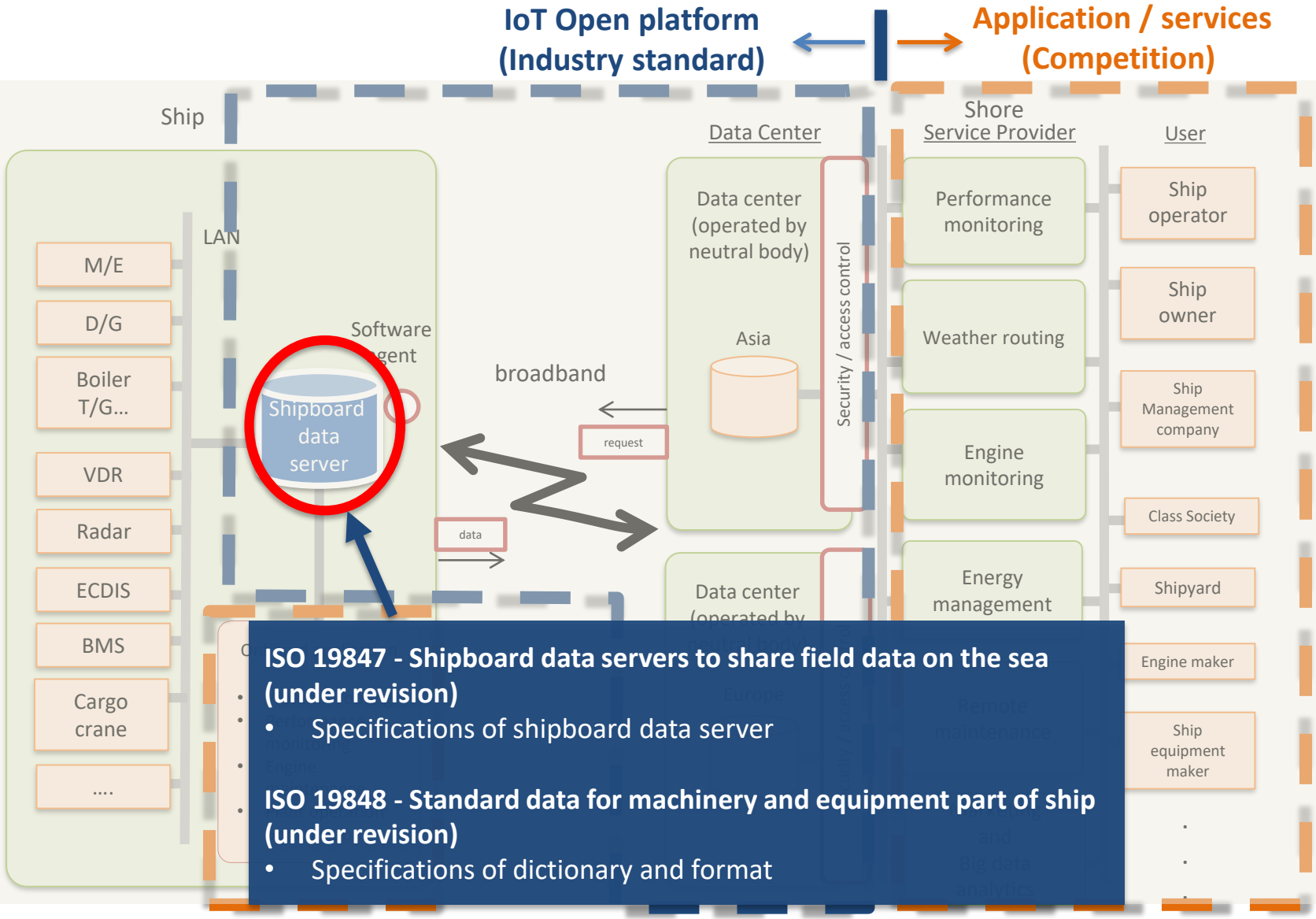
Open platform for data sharing in maritime industry



Outline

1. Introduction of SSAP
2. Open platform concept
3. Proposed standards ISO 19847 & 19848
4. Current activities in SSAP3
    1. **Revision of ISO 19847, 19848 & 16425**
    2. Proposal of ISO PWI 23807
5. Summary

Open platform for data sharing in maritime industry



Revision of ISO 19847

Shipboard data servers to share field data on the sea

Purpose of the revision

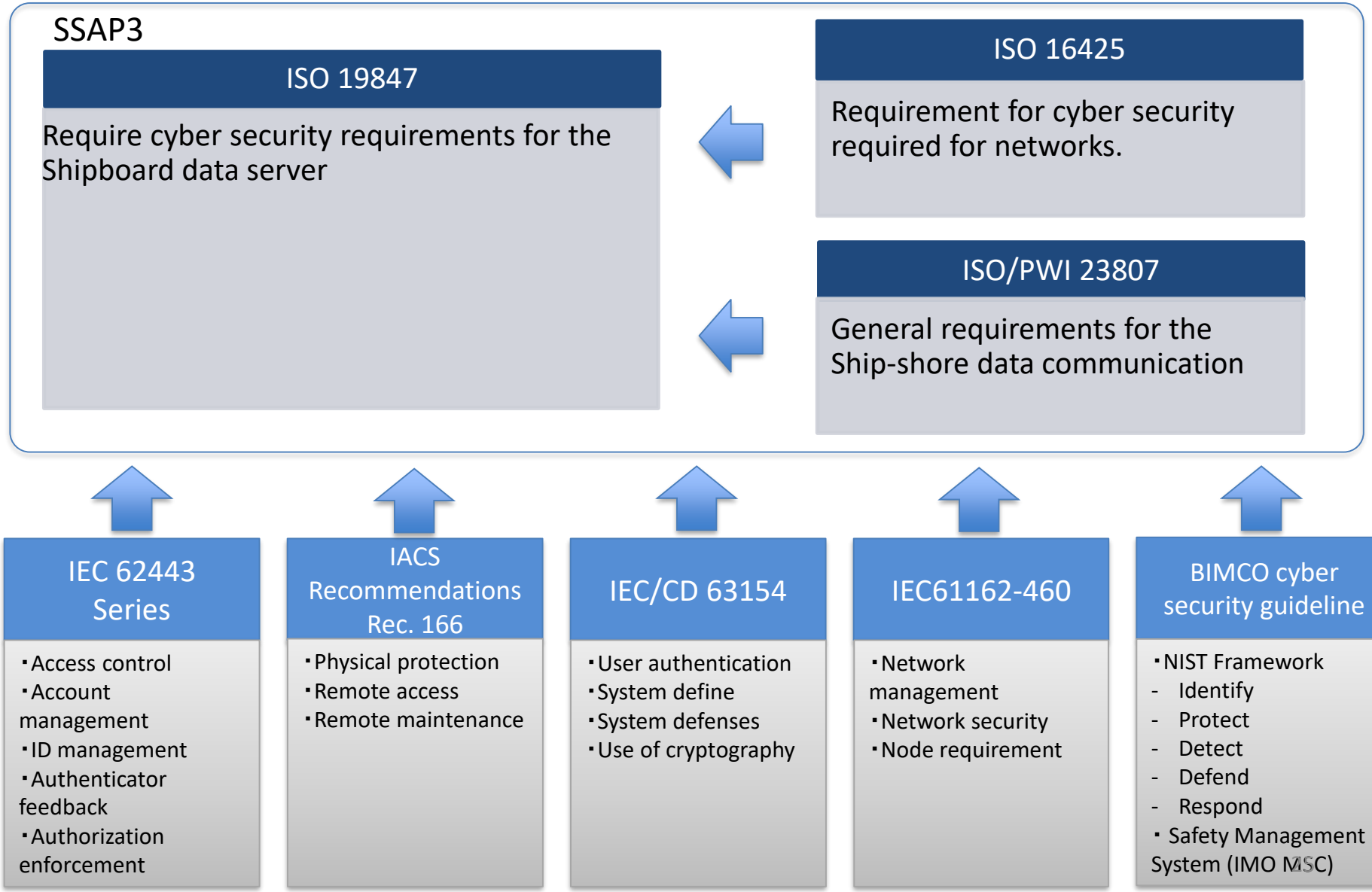
The purpose of this revised proposal is to reflect the following three major improvements to the existing ISO 19847 standard:

1. **Testing standards for third party approval**
   - Testing standards, which consist of test objectives, conditions, methods and test criteria, are provided by a tabular form as described in clause 7.

2. **Supplemental information for data calculation functions**
   - Supplemental information to assist implementation of data calculation functions is newly provided in subclause 6.5.

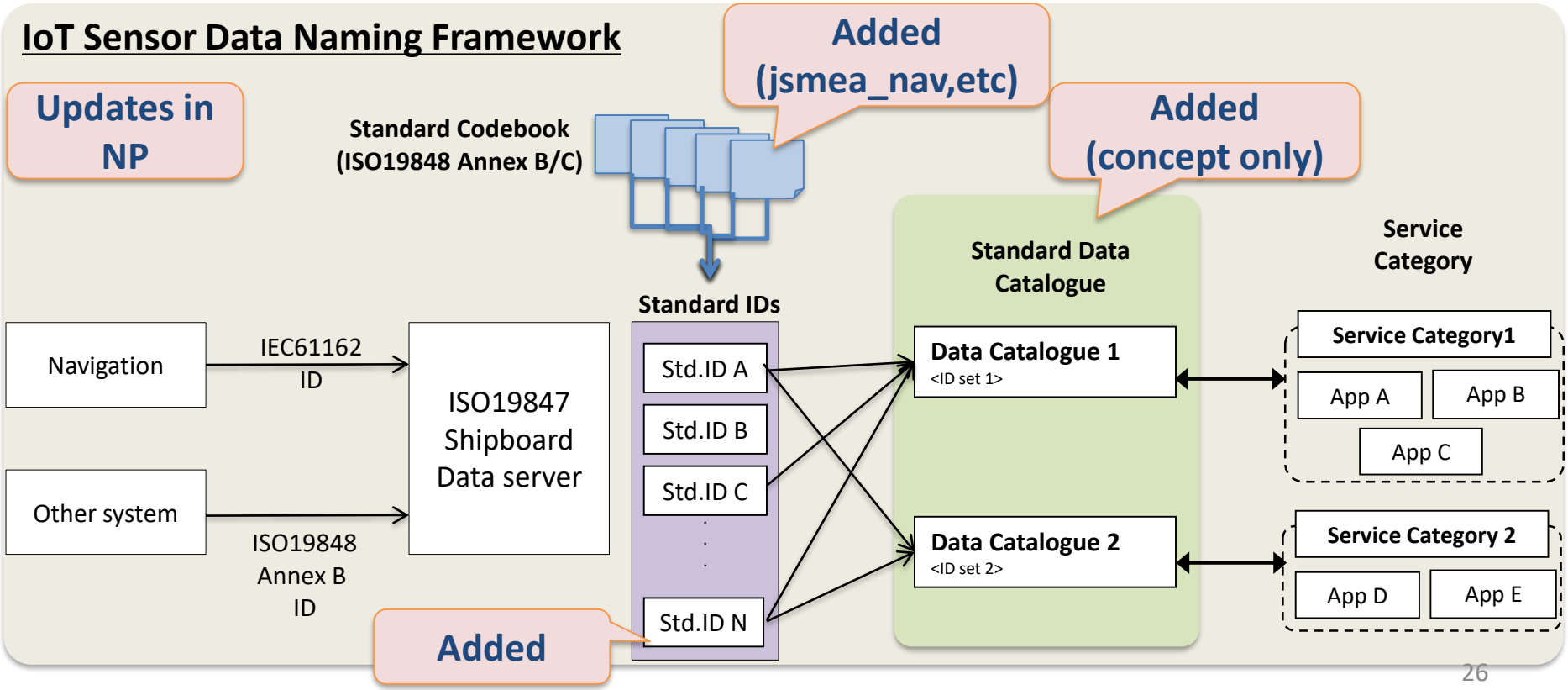
3. **Cyber security standards for the data server**
   - Specific security requirement for the shipboard data server is newly provided in clause 8.

Add Cyber security requirements

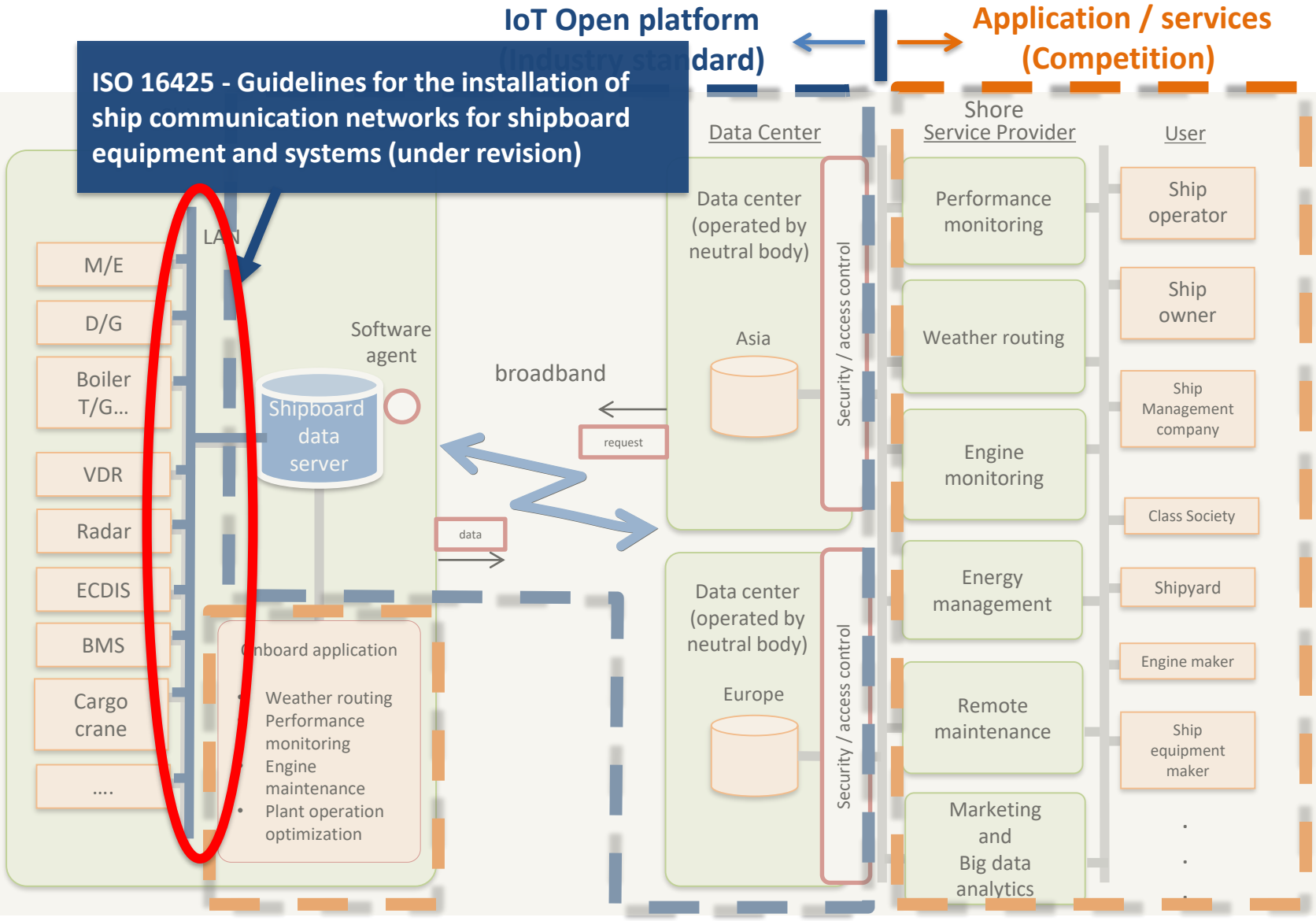


Revision of ISO 19848

- Naming IoT data (sensor data) is very important & essential work for utilizing data for AI and Big data. However, it requires a lot of effort to define naming scheme, dictionary and standard names.
- ISO 19848 Annex B & C provide scheme for Standard Codebook and Standard ID.
- Standard data catalogue, which consists of Standard IDs, can be defined in correspondence with service category.

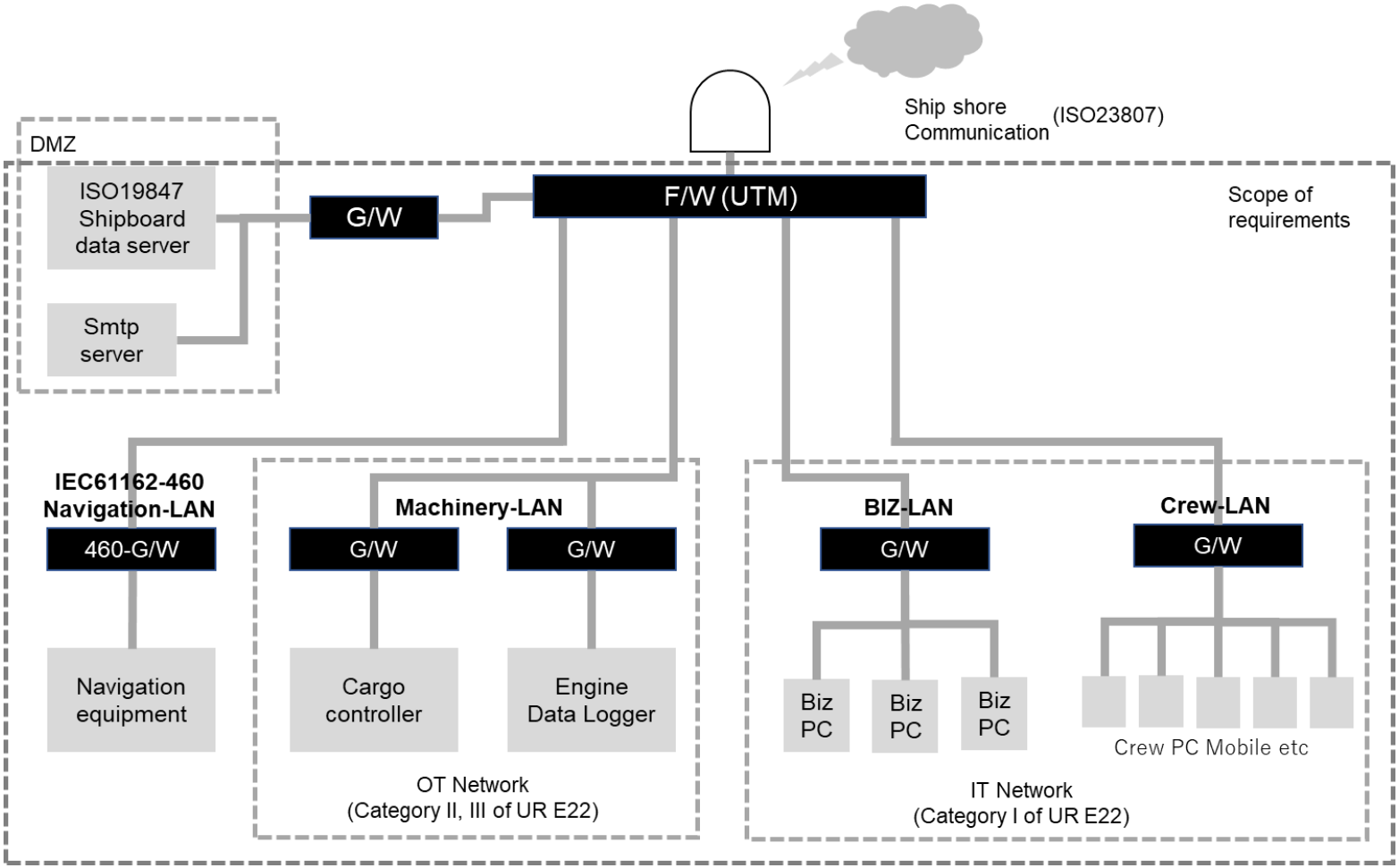


Open platform for data sharing in maritime industry



Revision of ISO 16425

Guidelines for the installation of ship communication networks for shipboard equipment and systems



Revision of ISO 16425

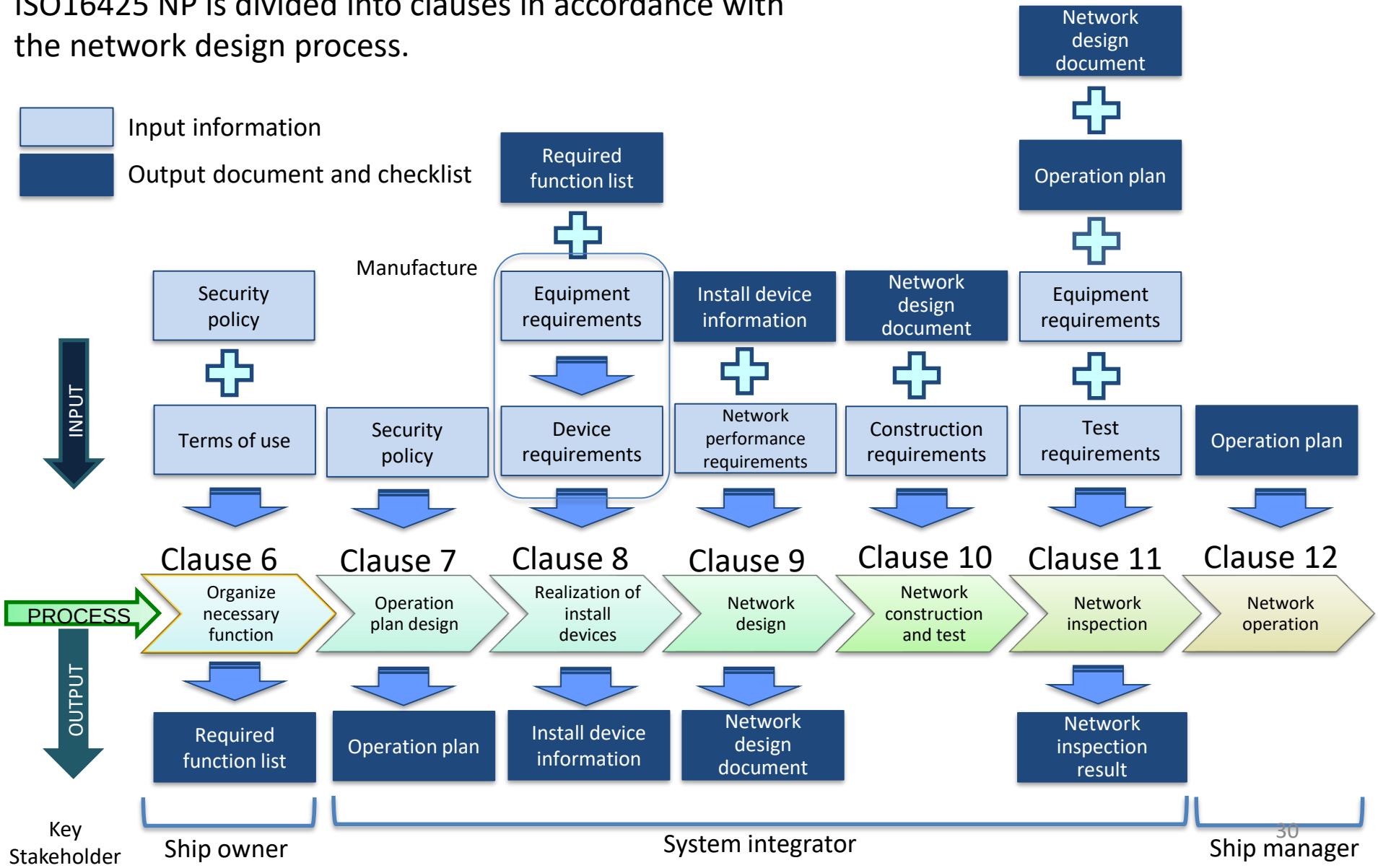
Guidelines for the installation of ship communication networks for shipboard equipment and systems

Purpose of the proposal

- Shipowners and shipbuilders using this standard have requested to clarify their respective roles, shipboard network design procedures, and acceptance criteria in order to maintain a uniform quality.
- Therefore, all chapters of the existing version of ISO 16425 have been updated in order to meet the above requirements.
- Designs for Wi-Fi networks, networks equipped with a Shipboard data server that conform to ISO19847/ISO19848, and requirements for cybersecurity for shipboard networks are also added to the revision.

Revision of ISO 16425

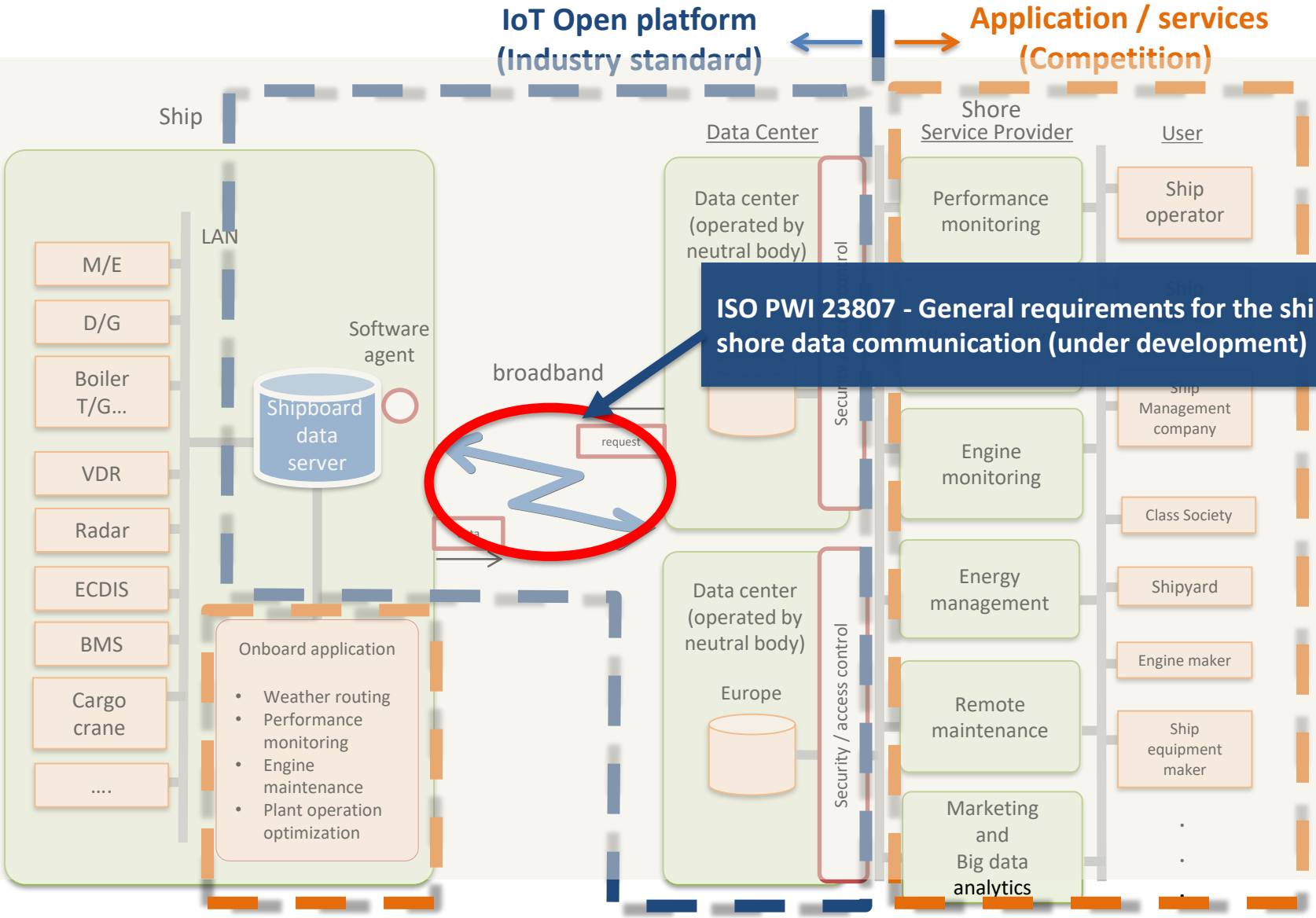
ISO16425 NP is divided into clauses in accordance with the network design process.



Outline

1. Introduction of SSAP
2. Open platform concept
3. Proposed standards ISO 19847 & 19848
4. Current activities in SSAP3
    1. Revision of ISO 19847, 19848 & 16425
    2. **Proposal of ISO NP 23807**
5. Summary

Open platform for data sharing in maritime industry



Current scope of ISO PWI 23807

In the 1st meeting of ship–shore data communication panel on the 15th Nov 2019 in Trondheim, the scope of ISO PWI 23807 was clarified as follows.

This document describes the requirements involved in ship to shore data communication between the shipboard data servers to the on-shore data servers. It defines:

- Asynchronous and synchronous communication
- A method to measure end-to-end communication quality
- Transport integrity
- Transport security (eg encryption, authentication and authorization)
- Management of data transmission (eg prioritization, logging, carrier awareness/management)
- Communication optimization (eg deduplication, compression, resume, multiplexing)
- Compliance with the data communication protocols, including but not limited to ISO 19847

This document will not cover:

- The security of the data producer/consumer (eg identity management)
- Communication equipment requirements
- Carrier performance requirements (eg bandwidth and latency)

Summary

- Activities of Smart Ship Application Platform (SSAP) Project are introduced.

- ISO 19847 & 19848 are the standards to support open platform to share ship IoT data in the maritime industry.

- Currently SSAP3 is working on the following ISOs.
  - ISO NP 19847 (revision) - Shipboard data servers to share field data on the sea
  - ISO NP 19848 (revision) - Standard data for machinery and equipment part of ship
  - ISO NP 16425 (revision) - Guidelines for the installation of ship communication networks for shipboard equipment and systems
  - ISO PWI 23807 - General requirements for the ship-shore data communication (under development)

ISO 19848 is gradually getting industry supports

SMART MARITIME NETWORK NEWS SMN MEMBERS EVENTS ABOUT

Smart Maritime Council announces support for shipboard machinery data standard

The Smart Maritime Council Rotterdam meeting, where the ISO 19848 vote was passed

Story By: Rob O'Dwyer | February 26, 2020 | Features

The Smart Maritime Council, the cross-industry membership group created by the Smart Maritime Network to improve technology interoperability in the industry, has announced its intention to support the use of the ISO 19848 data standard for shipboard machinery and equipment following a unanimous vote at the Council's most recent meeting in Rotterdam.

The Smart Maritime Council brings together maritime service and equipment providers, vessel operators and related industry stakeholders to discuss issues of technology compatibility, standardisation and harmonisation across the global transport chain.

Over the course of the last year the group has undertaken discussions at a series of regional meetings in

https://smartmaritimenetwork.com/2020/02/26/smart-maritime-council-announces-support-for-shipboard-machinery-data-standard/
(Feb 2020)

SMART MARITIME NETWORK NEWS SMN MEMBERS EVENTS ABOUT

DNV GL confirms ISO 19848 support on Veracity platform

Story By: Rob O'Dwyer | July 3, 2020 | Connectivity and IoT

Classification society DNV GL has confirmed that it has added support for the ISO19848 data standard for shipboard machinery and equipment to its Veracity maritime data platform, to streamline the collection, storage and analysis of sensor data.

As of May 2020, Veracity has begun supporting both the ingestion of data in the ISO19848 format, and the extraction, querying and exchange of data through Veracity APIs, using the standard.

"Supporting ISO19848 is a natural step for Veracity. We want to help companies increase their rate of innovation. Easy to use data in a standard format enables faster time to market for value adding services," said Mikkel Skou, Director of Veracity.

"DNV GL has around 12,000 vessels described according to the DNV GL Vessel Information Structure. This model is compliant with the ISO 19848 standard, enabling our customers to work smarter and more effectively with their data."

https://smartmaritimenetwork.com/2020/07/03/dnv-gl-confirms-iso-19848-support-on-veracity-platform/
(July 2020)

Thank you very much for your attention

Smart Ship Application Platform 3 (SSAP3) Project

Web: https://www.jsmea.or.jp/ssap/
Contact: ssap@jsmea.or.jp