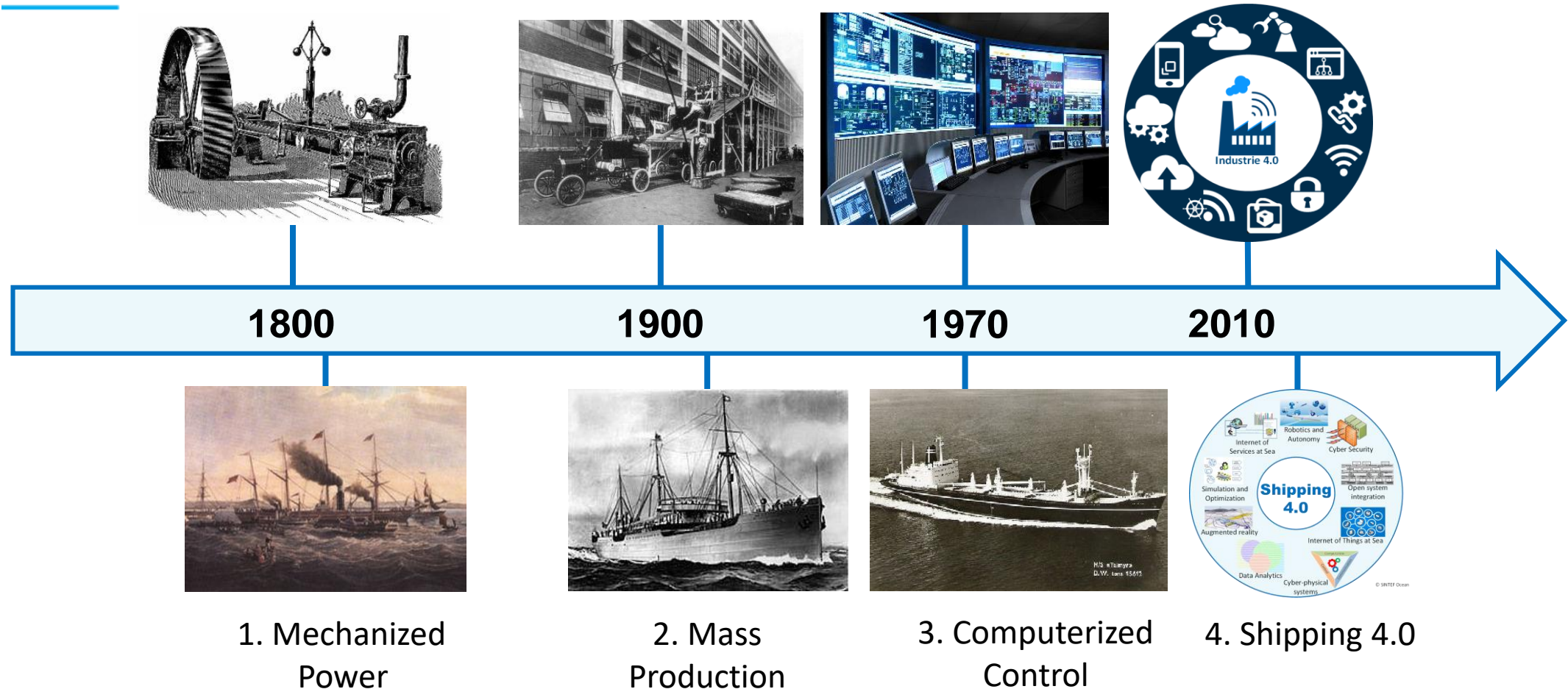


A composite background image showing a snowy mountain range. In the foreground, there's a body of water with a large white ship, a smaller blue boat, and yellow buoys. To the left, there are wind turbines and an offshore oil platform. In the background, a modern city with tall buildings is visible, and a satellite is in the sky.

DATASIKKERHET I MARITIM TRANSPORT: BLOCKCHAIN ELLER PUBLIC KEY?

Ørnulf Jan Rødseth MSc - OrnulfJan.Rodseth@sintef.no
Senior Scientist, SINTEF Ocean AS
General Manager, Norwegian Forum for Autonomous Ship

The fourth shipping revolution is on



Shipping 4.0 and game changers



Enabling technology

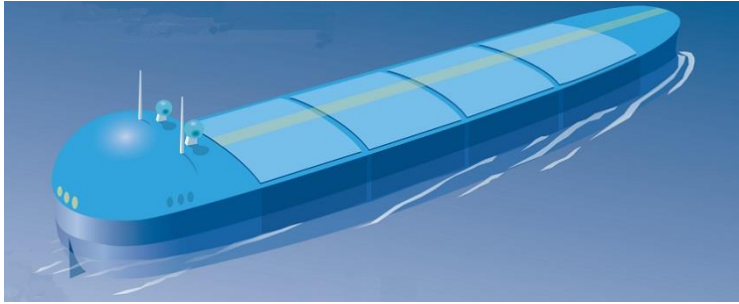
Technology with high impact

Game changers

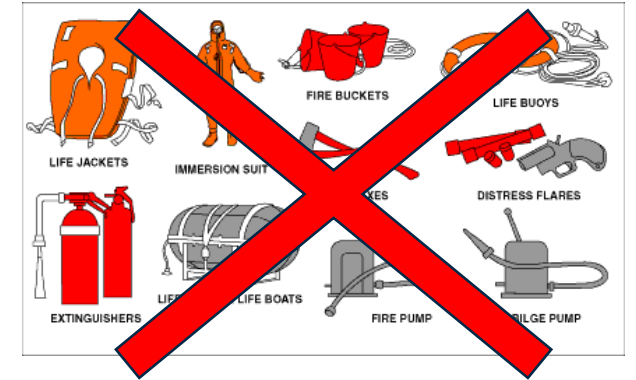
© SINTEF Ocean

Game changers: Autonomy, automation and digitalization

Unmanned or autonomous ?



No accommodation
Less power
More cargo



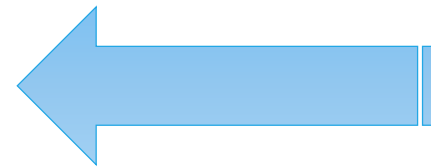
No safety equipment

No voluntary speed loss

New constructions



Enables completely new transport system concepts

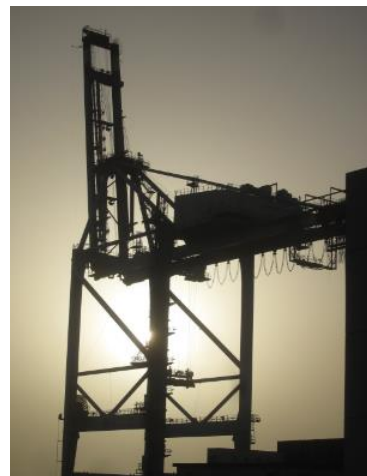
A 3D rendering of the Yara Birkeland, a blue and white autonomous cargo ship with 'Zero Emission' and 'Yara Birkeland' text on its side.

No crew

No crew related costs



They can increase automation of processes and data: Better integration into supply chain



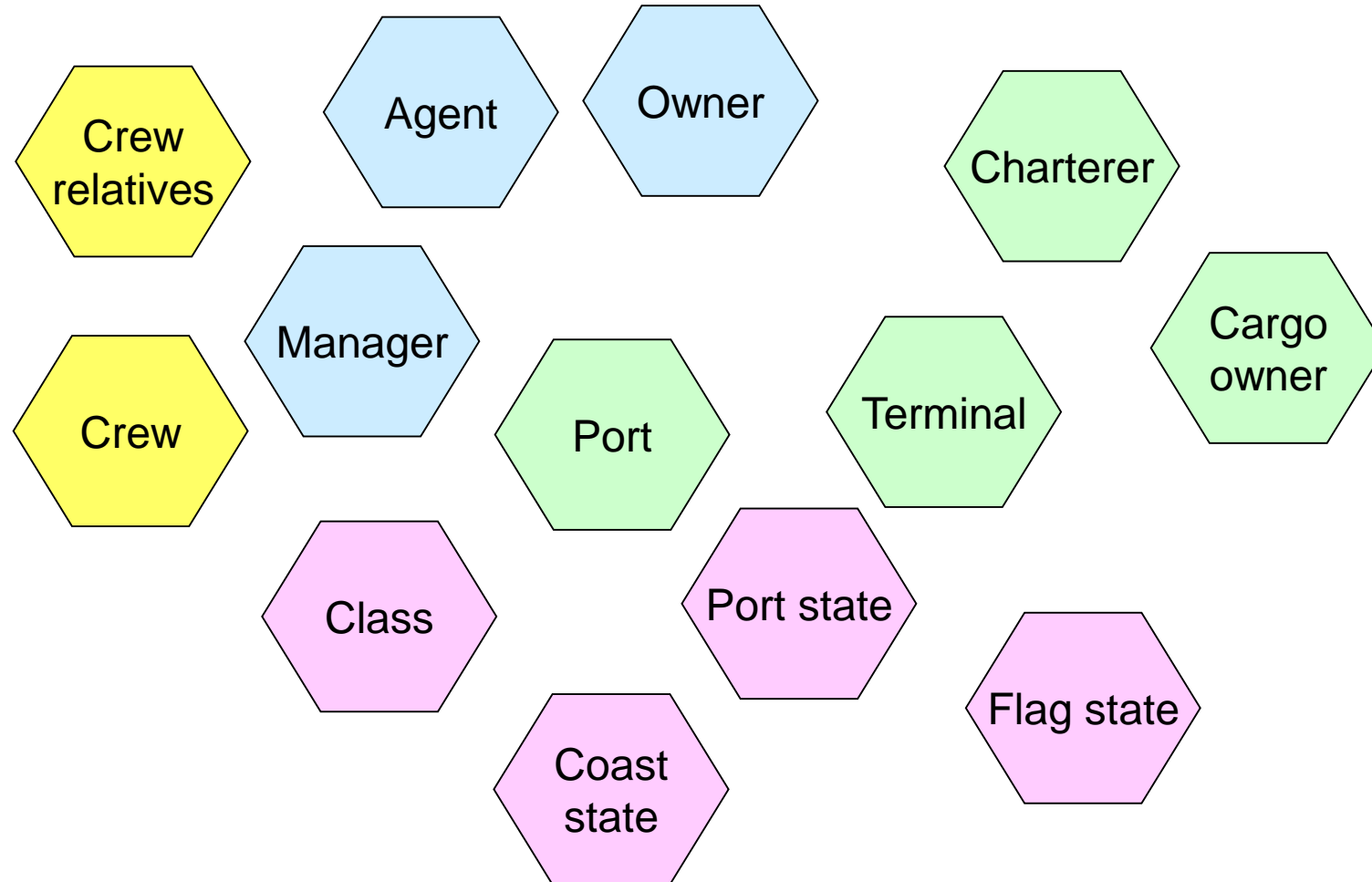
Ship and terminal operations



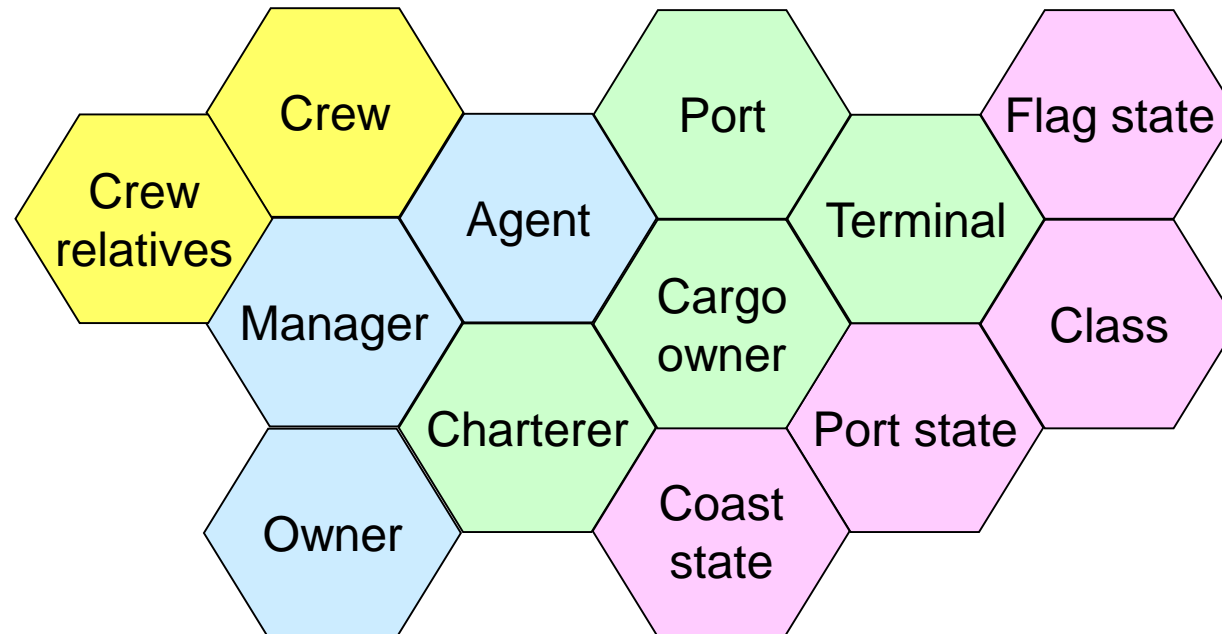
Connected and Automated
Transport (CAT)

Automated processes and transport systems

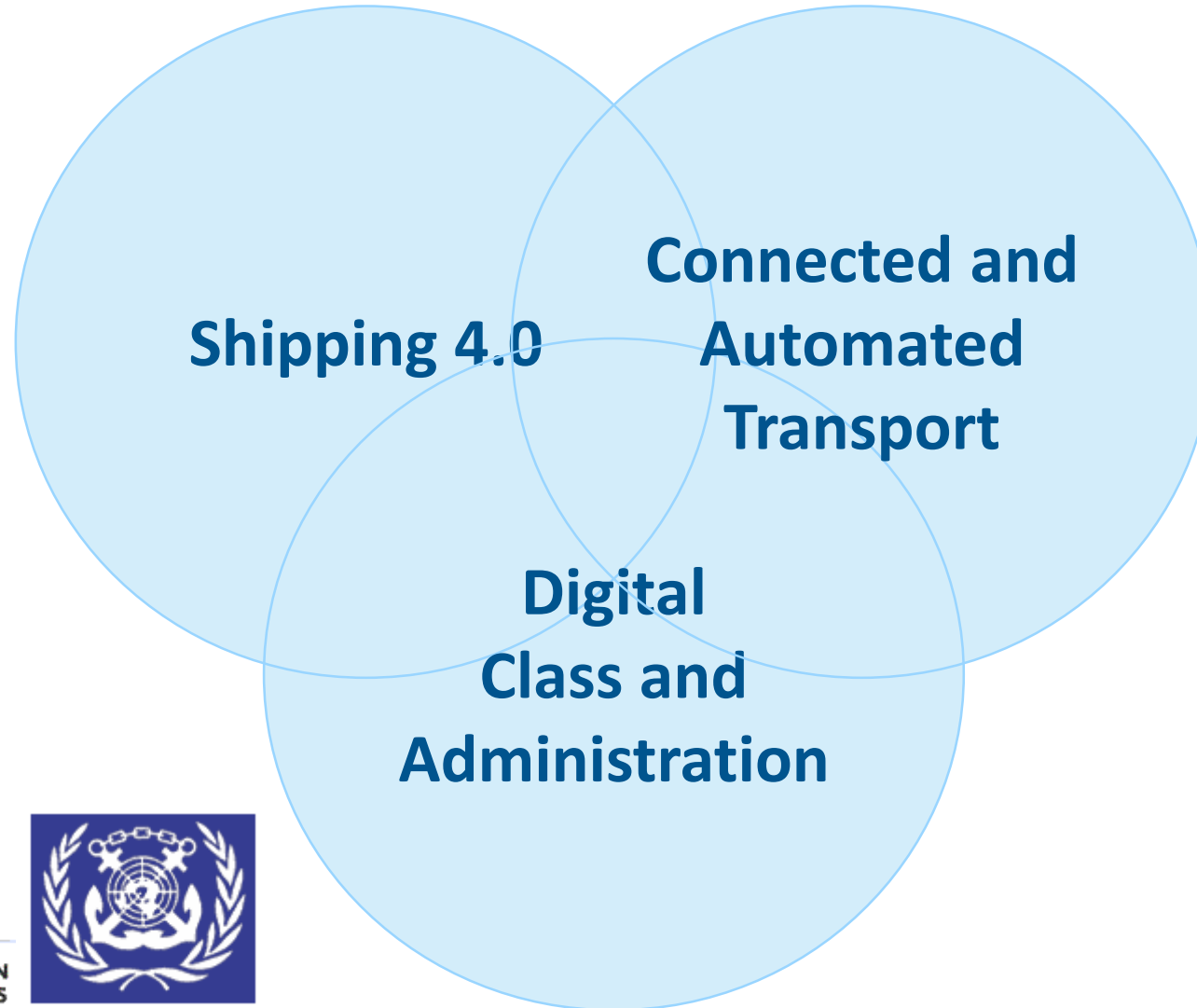
Shipping today is too fragmented – lack of trust!



We need to improve trust and cooperation

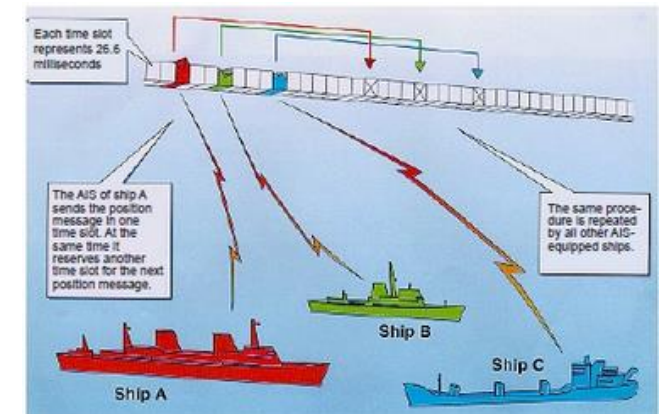


It is a general digitalization process



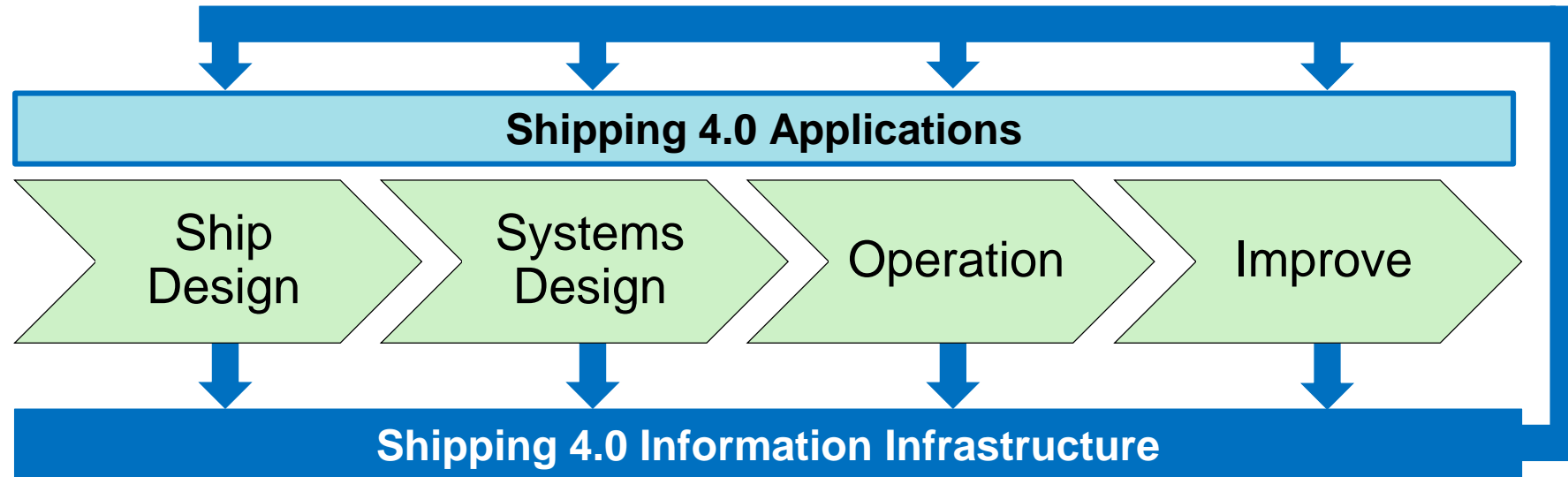
Process automation also requires trust

- Is it the correct sender?
- Has the contents been tampered with?
- Can we prove that we sent a mandatory report?
- Can we protect data from unauthorized access?

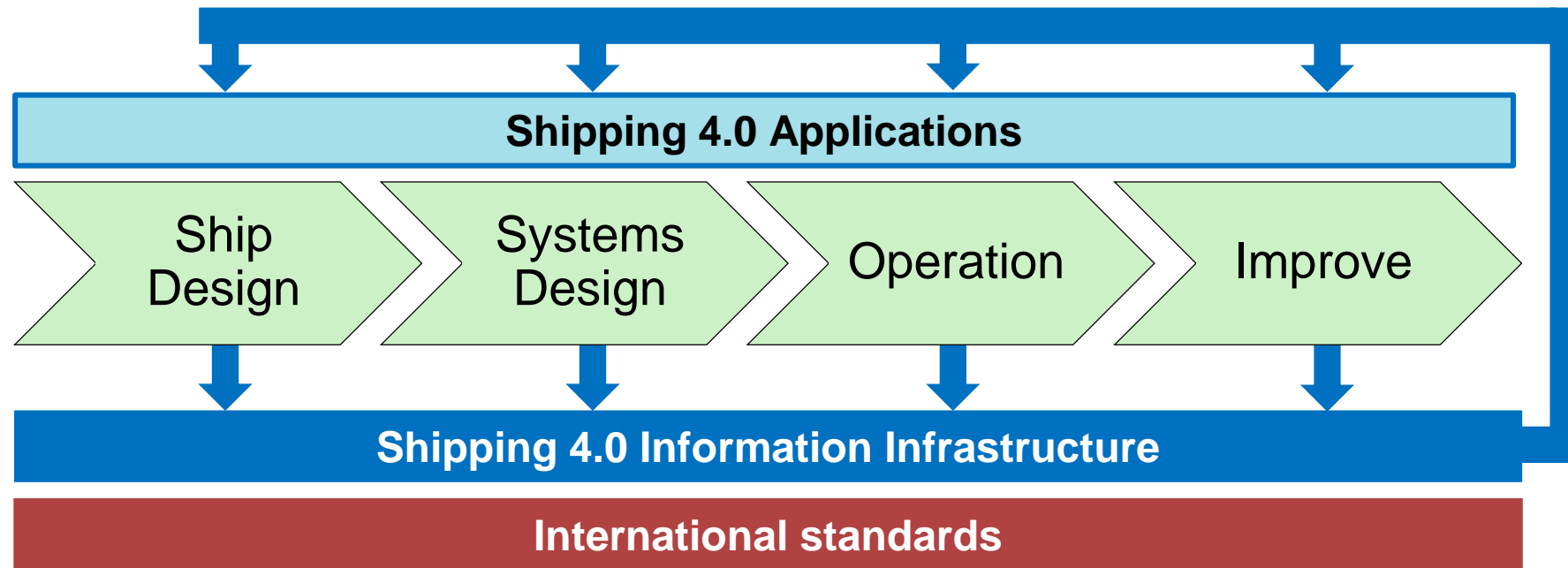


Data ownership and governance

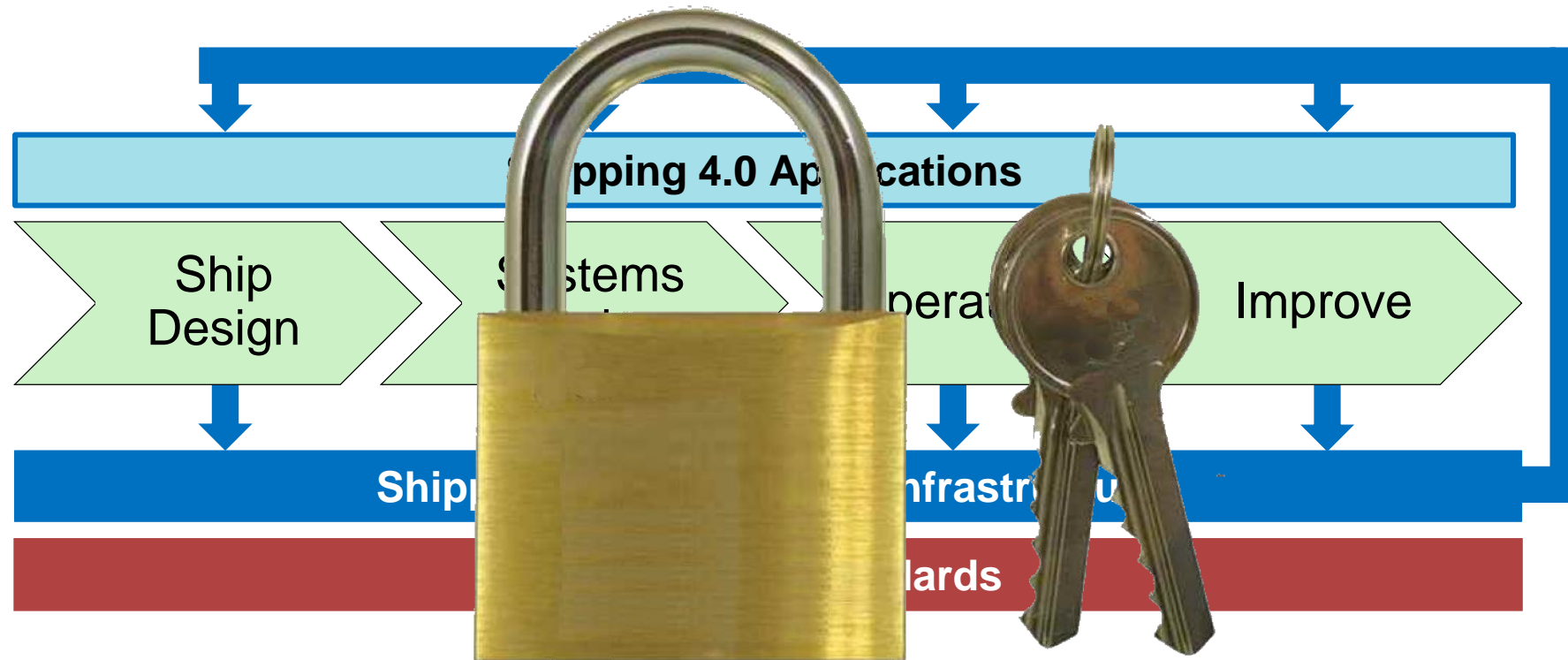
Importance of data management through ship's life cycle



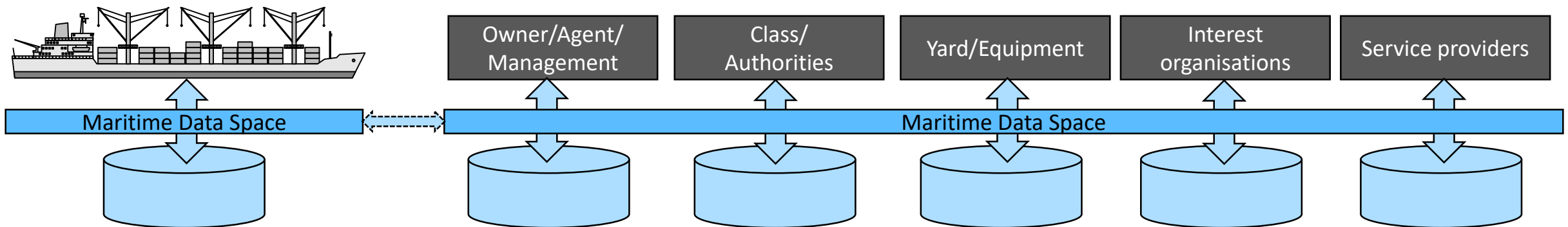
We need standards!



and secure ownership and governance of data

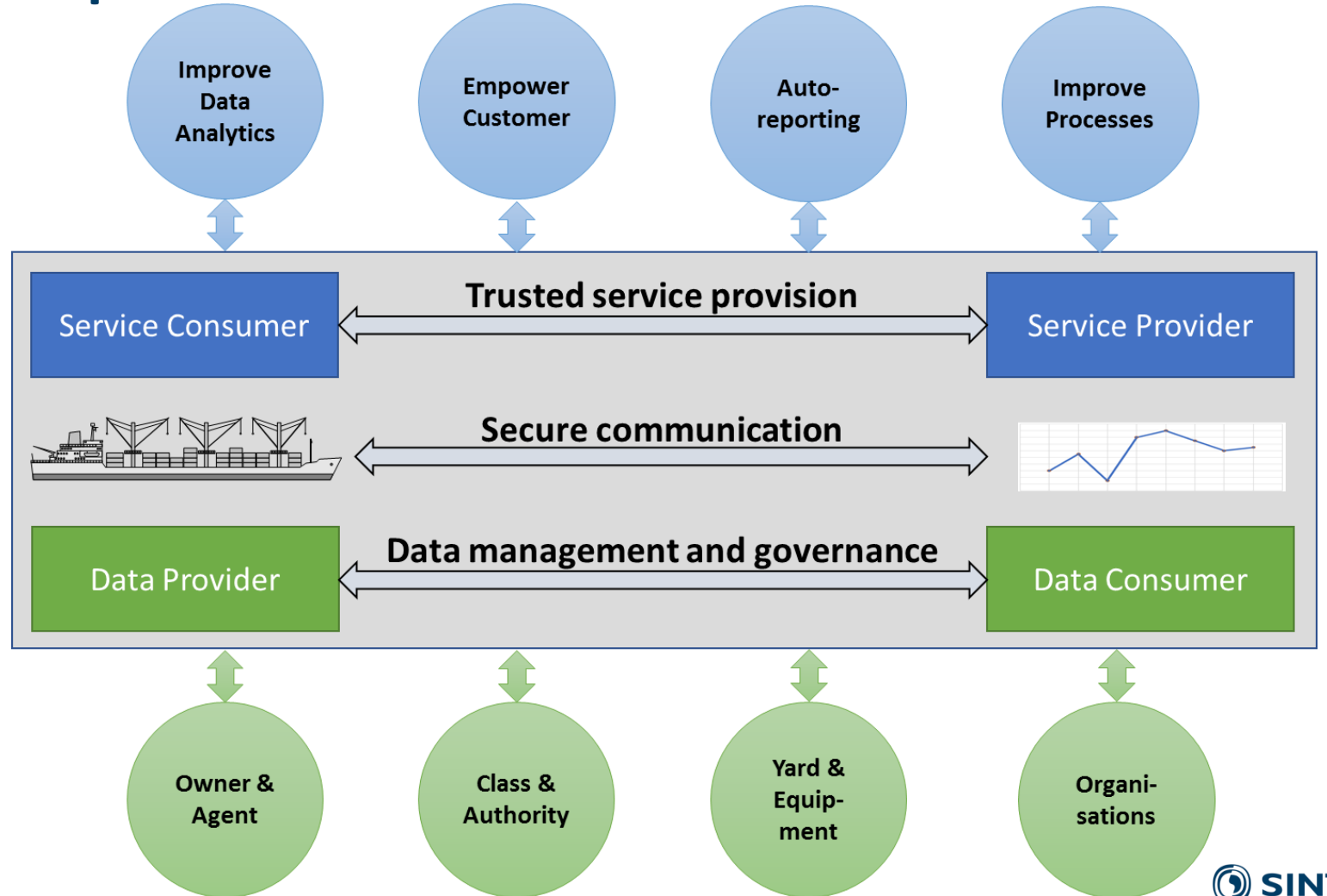


Data may be stored in several locations



Maritime Data Space - MDS

INTERNATIONAL DATA SPACES ASSOCIATION

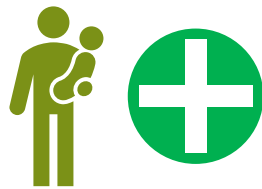


Industrial Data Spaces



Some application areas

Pharma



- Pharma industry
- Healthcare providers
- Doctors

Automobile



- Manufacturers
- Traffic control
- Municipalities

Trade



- Retail
- Consumer goods
- Logistics providers

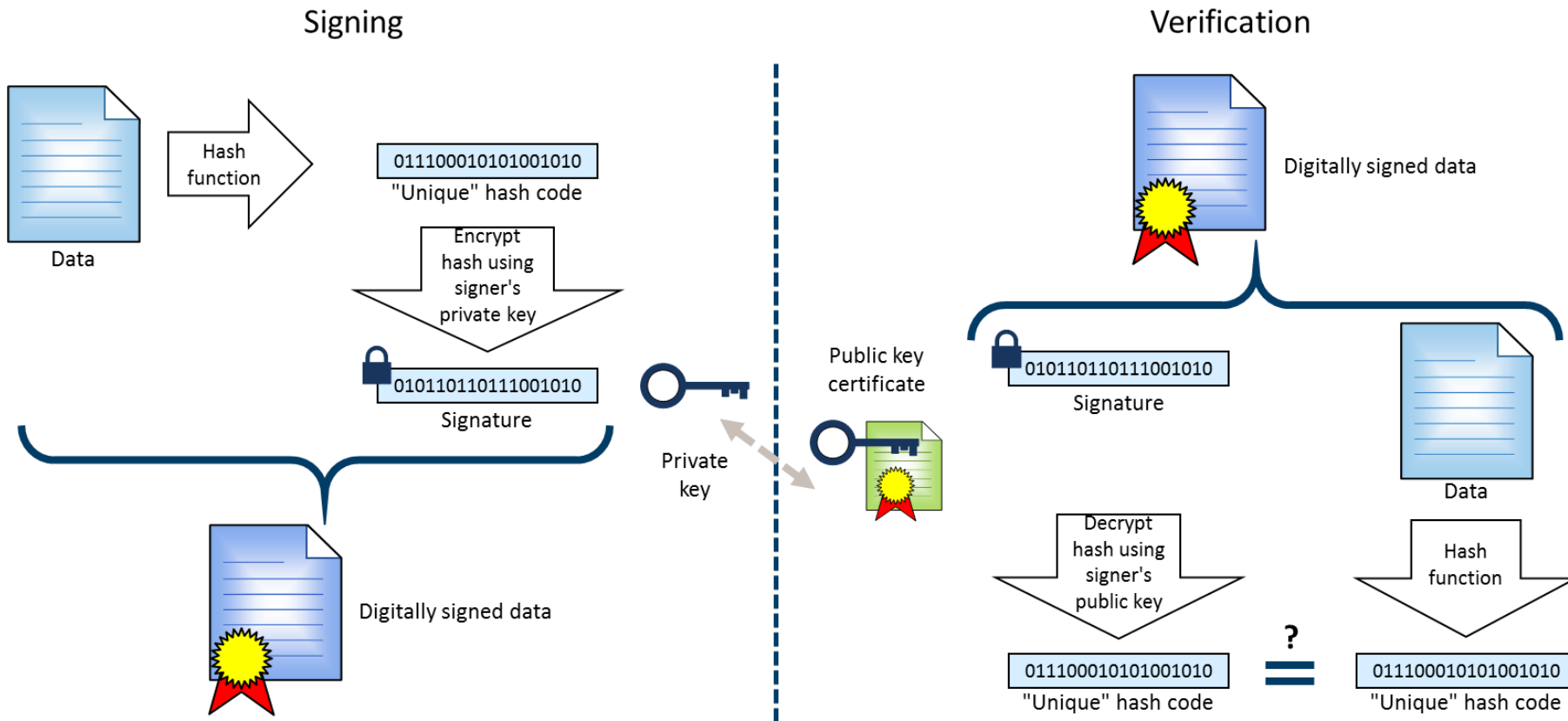
Production



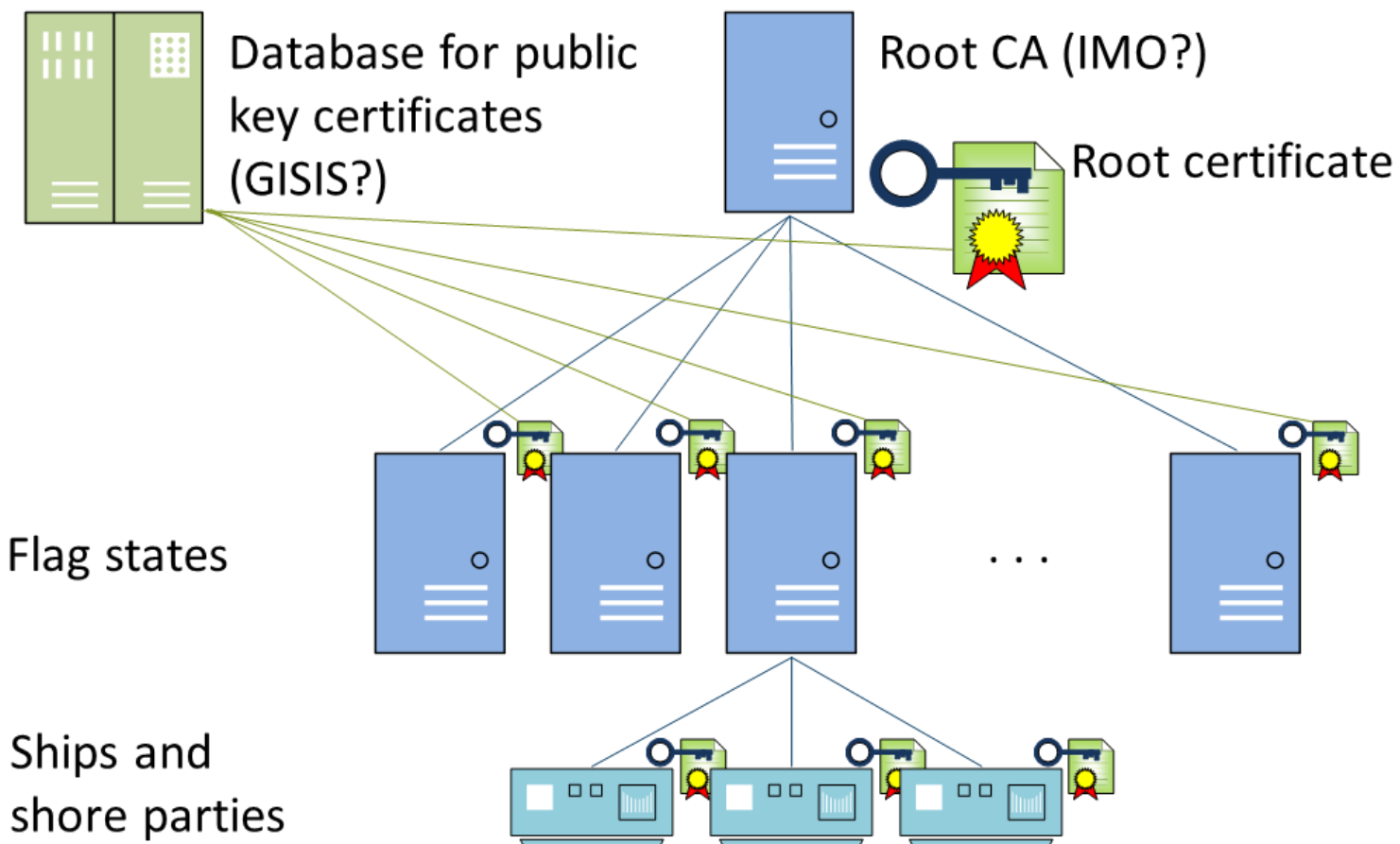
- Car manufacturers
- Suppliers
- Logistics providers

Building a trust framework

A digital trust framework based on public key



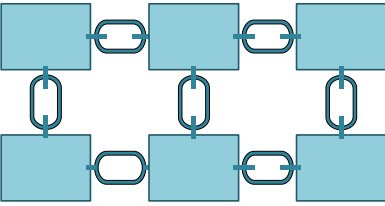
Public Key Infrastructure – PKI



<http://cysims.no/>

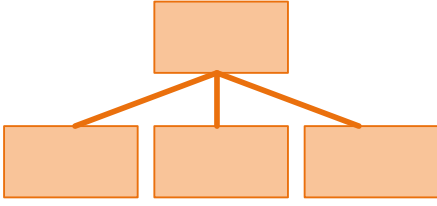


Conventional PKI or Blockchain?



Blockchain

Operates without a trusted third party	
Transactions are stored openly across many nodes	
Integrity protection	
Fast and inexpensive transactions	
Can verify data integrity without constant connectivity	
Proof of identity	



**Public key infrastructure
PKI**

And then, the end!



The 1st International Conference on Maritime Autonomous Surface Ship (ICMASS 2018)

IMPORTANT DATES

September 1, 2018: are required to send an abstract (≤ 200 words, excluding author's name, affiliation, address, telephone number, email address, title of paper, and 5 key words) by this date. The abstract shall be submitted to leeki@kmou.ac.kr.

September 10 Acceptance notifications will be emailed by this date. If your paper is accepted, you have the opportunity to deliver a 20-minute presentation or prepare a poster.

September 30, 2018: Camera ready final papers (≤ 2 pages excluding references) must be submitted by this date.

November 8-9, 2018: ICMASS 2018 at Busan Exhibition and Convention Center (BEXCO), Busan, Republic of Korea.



SAVE THE DATE

THE INTERNATIONAL AUTONOMOUS SHIPPING SUMMIT

03 June 2019 | 10:00 - 18:00 | Clarion Hotel | The Hub | Oslo, Norway

FIND OUT MORE AT WWW.AUTONOMYSUMMIT.COM

NFAS Norwegian Forum for
Autonomous Ships


KYSTVERKET
NORWEGIAN COASTAL ADMINISTRATION


Sjøfartsdirektoratet
Norwegian Maritime Authority

www.autonomysummit.com

Conclusions



- Shipping 4.0 is coming!
- Based on Industry 4.0, but adapted to shipping.
- Main game changers in autonomy, automation and digitalization.
- Need standards for data management and governance: MDS?



Technology for a better society