

Energy transition & Digitization



René van der Plas, director Port of Rotterdam International
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AAPALATINO XXVIII CONGRESO LATINOAMERICANO DE PUERTOS
MIAMI 2019

19-21 DE NOVIEMBRE DE 2019 | HOTEL INTERCONTINENTAL MIAMI, EEUU

The Port of Rotterdam Authority creates **economic and social value** by working together with clients and stakeholders on the realization of **sustainable growth** in Rotterdam's world-class port.



469M tons

#1 Europe, #9 World

14.5M TEU

**#1 Port Infrastructure
(World Economic Forum)**

385,000 employees

6.2% GDP (€46B)

**29,600 vessels
105,000 barges**

**Profit €254M
(€707M revenues)**

12,643 ha

Depth up to 75 ft / 24 m

Market Share 37%

**± €200M (PoR investments)
± €1.5B (private investments)**

Introducing Port of Rotterdam



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Maasvlakte 2, area for sustainable development



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The change of an era.....

Turning Rotterdam into the "World's Smartest Port" with IBM Cloud & IoT

Rotterdam as Waste-to-Value hub

Autonomous ships through smart innovation

Rotterdam Commissions "Digital Twin" of Port Infrastructure

Blockchain is taking shape in Port of Rotterdam
Port of Rotterdam announced that the first blockchain applications have begun shaping. BlockLab, in a joint collaboration with the Port of Rotterdam Authority and the Municipality of Rotterdam, is the leader of these applications.

Port of Rotterdam proceeds with digitalization

How Europe's busiest port is helping make autonomous ships a reality

BPA, Port of Rotterdam Joining Forces on Digitalization



The British Ports Association and Dutch Port of Rotterdam have launched a joint smart ports paper as they aim to explore opportunities offered by port digitalization.
In the paper, the two sides necessary to create and between

PORT OF ROTTERDAM SIGNIFICANTLY REDUCES CO2 WITH BLUE HYDROGEN

making shipping more sustainable on a global level

Port of Rotterdam announced the beginning of a collaboration with IBM on a multi-year digitisation initiative to transform the port's operational environment using internet of things (IoT) technologies in connected ships in the future.

World's smartest port': How plans to digitize Port of Rotterdam

How Rotterdam becomes the smartest port in the world

strategy of Europe's largest port is a project using various technologies and services from IBM, Cisco and Axians.

science, administration the Rotterdam innovation

Port of Rotterdam: Hyper-Smart Container to Begin Round the World Trip



Image Courtesy: Port of Rotterdam

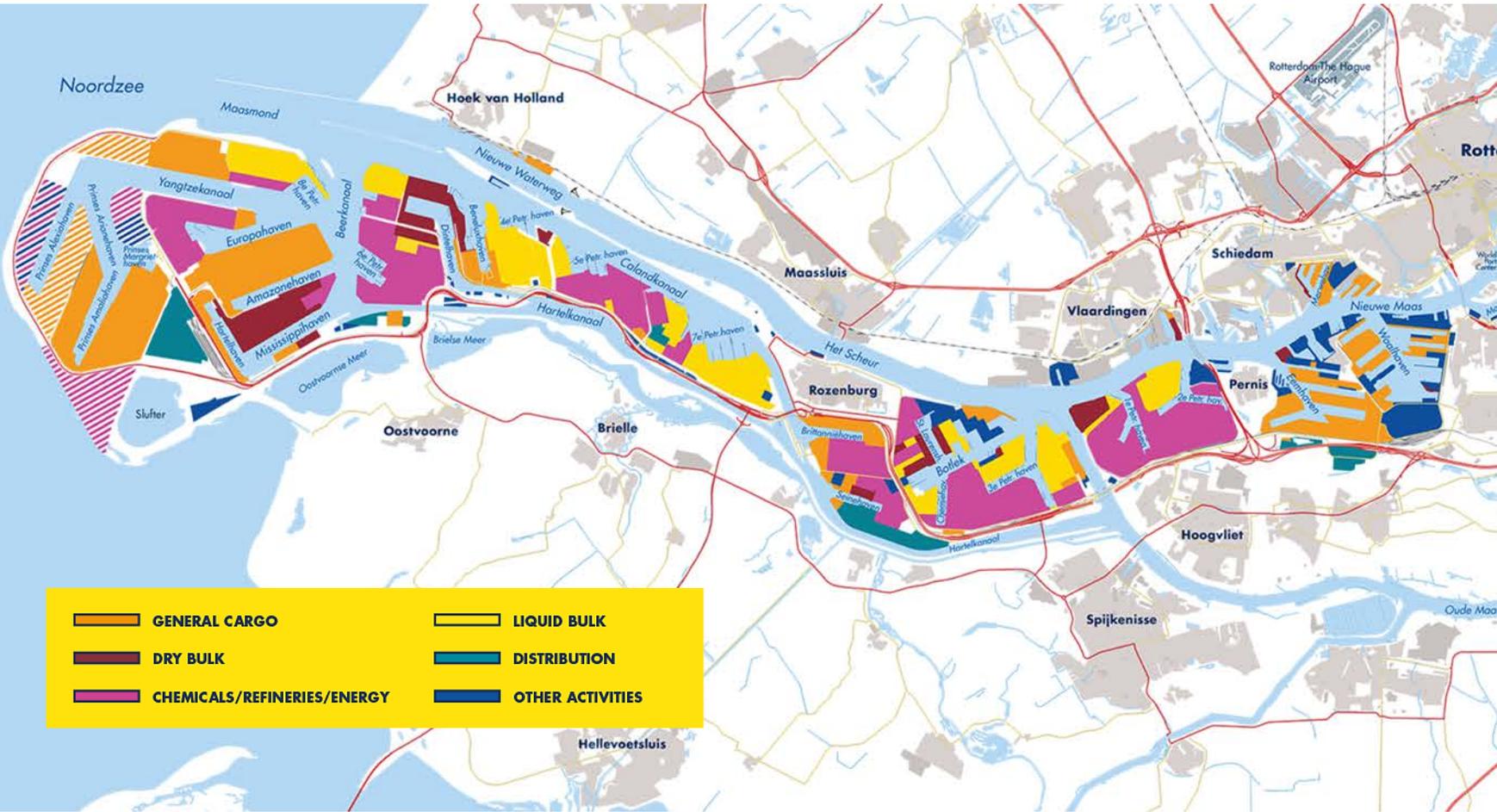
Dutch Port of Rotterdam is sending today the hyper-smart Container 42 on a two-year data-collecting mission around the world.
Before it embarks on the long journey, the container will be making its first stop in Munich, Germany, in early June. Here it will be presented to the public during the trade event Transport Logistic 2019 (TLM).

During this journey, the container - equipped with sensors and communications equipment - will be measuring changes in parameters like vibration, slope, position, sound, local air pollution, humidity and temperature.
The unit has also been fitted with solar panels, which can be used to determine how much power a container can generate during a given journey by ship, train or truck.



The port industry is carbon intensive

20% of the Netherlands' total CO2 emissions



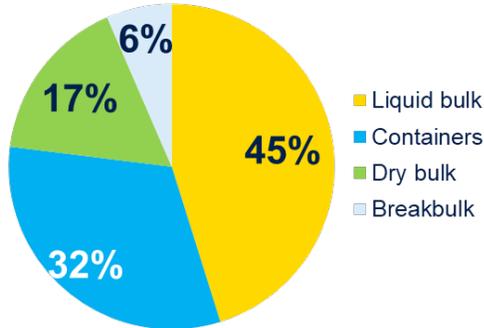
> 30 refinery processes



> 40 petrochemical processes



> 70 electricity generation units



Energy transition in the Port of Rotterdam

3-step report direction 2050

AND-AND APPROACH

- And help existing industry and logistics cluster to adjust to future climate demands
- And attract new sustainable industries
- In doing so, protect and enhance economic value
- Carve out an enhanced competitive position

IN THREE STEPS TOWARDS 2050



Energy transition program



STEP 1

EFFICIENCY; INFRA FOR HEAT, STEAM, CCUS



STEP 2

A NEW ENERGY SYSTEM



STEP 3

A NEW SYTEM FOR RAW MATERIALS AND FUELS



2050

LIMIT GLOBAL WARMING TO 1,5°C to 2°C

NOW

- EFFICIENCY AT PLANTS
- HEAT NETWORK
- STEAM NETWORK BOTLEK
- CONNECTION WINDFARMS NORTH SEA
- PORTHOS (CCUS)
- COLD IRONING
- EFFICIENCY SHIPPING INDUSTRY

- PRODUCTION WIND TURBINES
- WINDFARMS ONSHORE
- NORTH SEA WIND POWER HUB
- SOLAR PANELS
- BLUE HYDROGEN
- COFIRING BIOMASS
- GREEN HYDROGEN (POWER TO H₂)

- WASTE-TO-CHEMICALS
- PILOTS CIRCULAR ECONOMY
- BIO-KEROSENE
- ZERO EMISSION INLAND SHIPPING (ELECTRIC, HYDROGEN)

COMING SOON

- CCU: MINERALIZATION, GREEN HOUSES

- ENLARGING ELECTRICITY NETWORK
- WINDFARMS OFFSHORE
- POWER TO HEAT
- POWER TO HYDROGEN
- HYDROGEN NETWORK
- GEOTHERMICS
- ENERGY STORAGE

- WASTE
 - BIO
 - E → H₂
 - CO₂
- } • FUELS
• CHEMICALS

MAY. 2019



There is a lot to gain in logistics

30%

Of shipments
is delayed

28

Parties involved
per transaction

44%

Of executives
describe supply
chain visibility
as top priority

25%

Of trucks on
the road is empty



Our world in transition

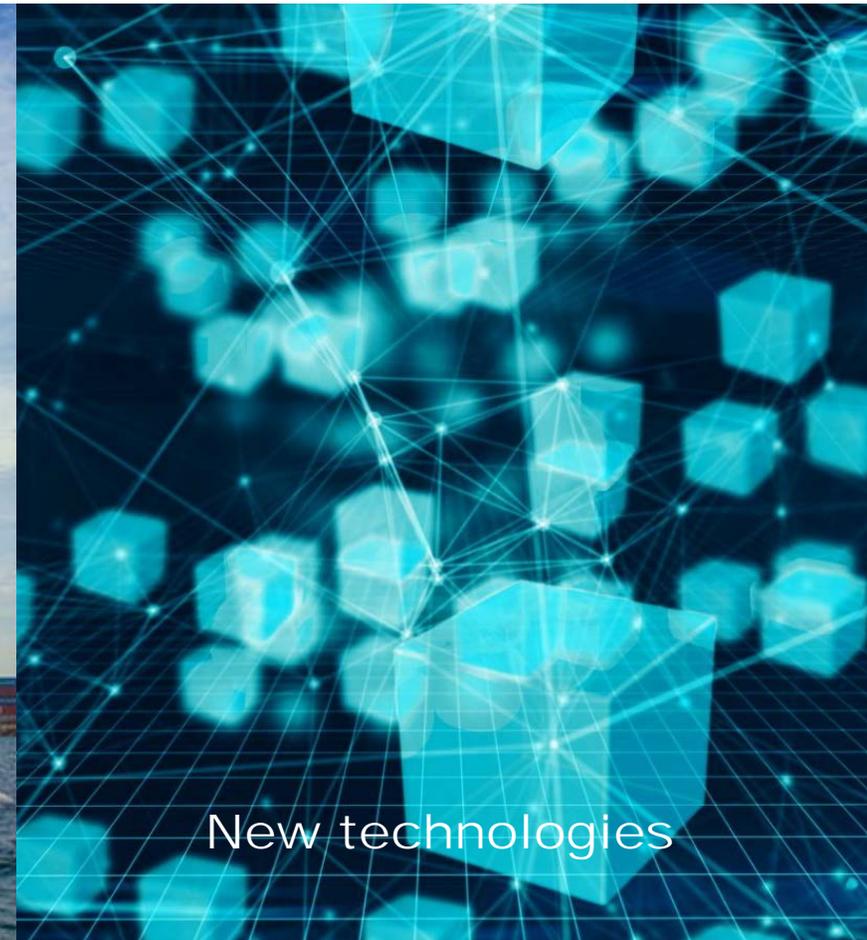
Faster than we think. With greater impact than we think.



New partnerships



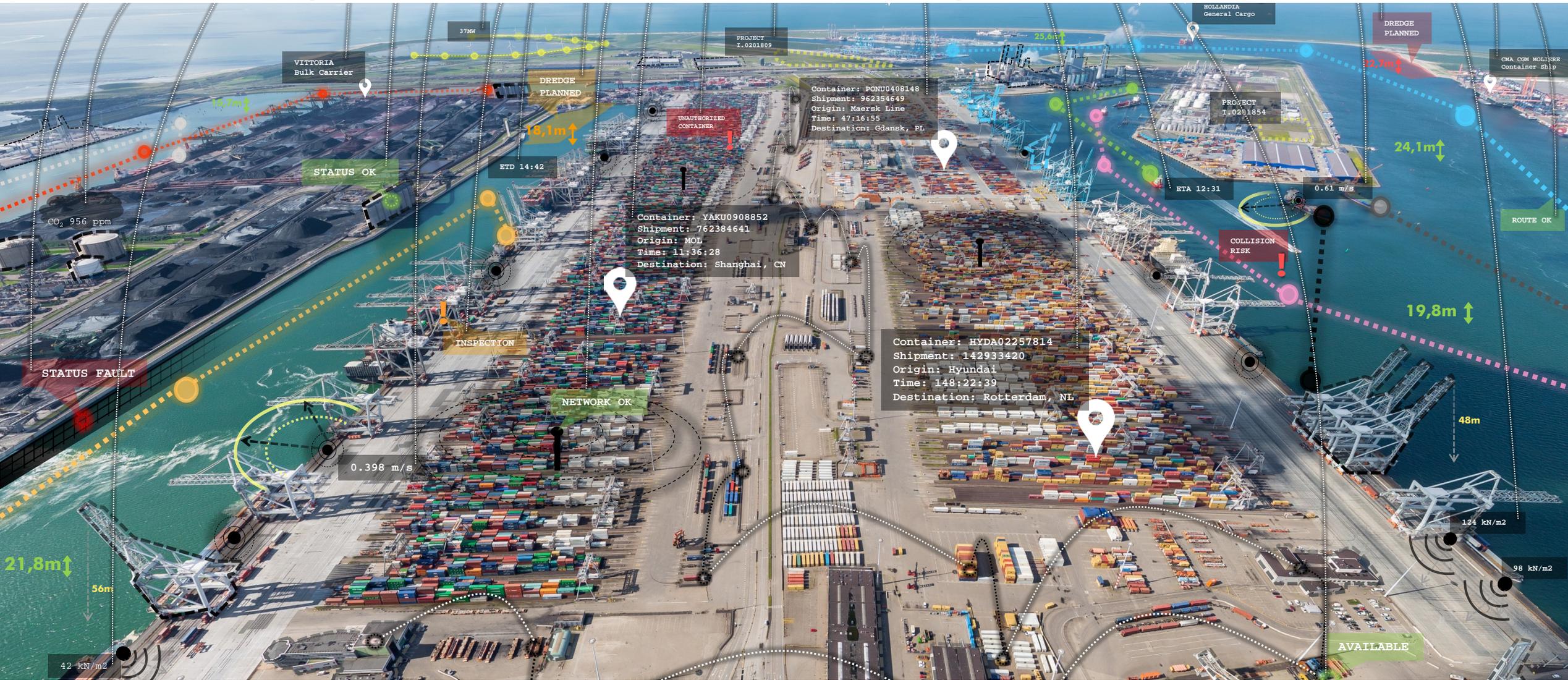
New companies



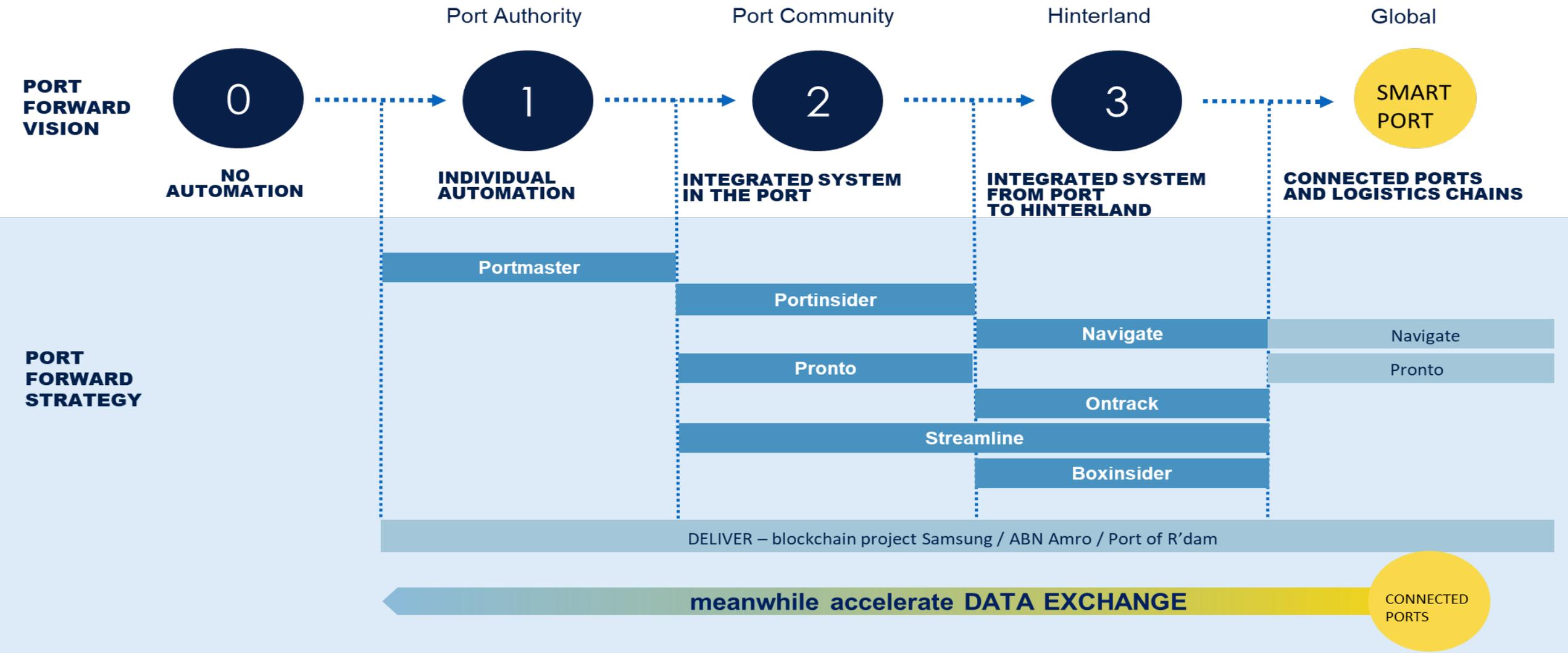
New technologies



A smart port is a connected port



Step by step towards a digital port



THANK YOU FOR YOUR ATTENTION.



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