

Gemelo Digital e IA

”Transformacion Digital y Adopcion
Tecnologica en Sector Portuario”

August, 2024



Presentation Overview

Digital Transformation and Technology Adoption at Ports Industry

- Introduction and background.
- Company vision and purpose.
- Practical cases of study at Ports.
- Solution value proposition.

Introduction and background



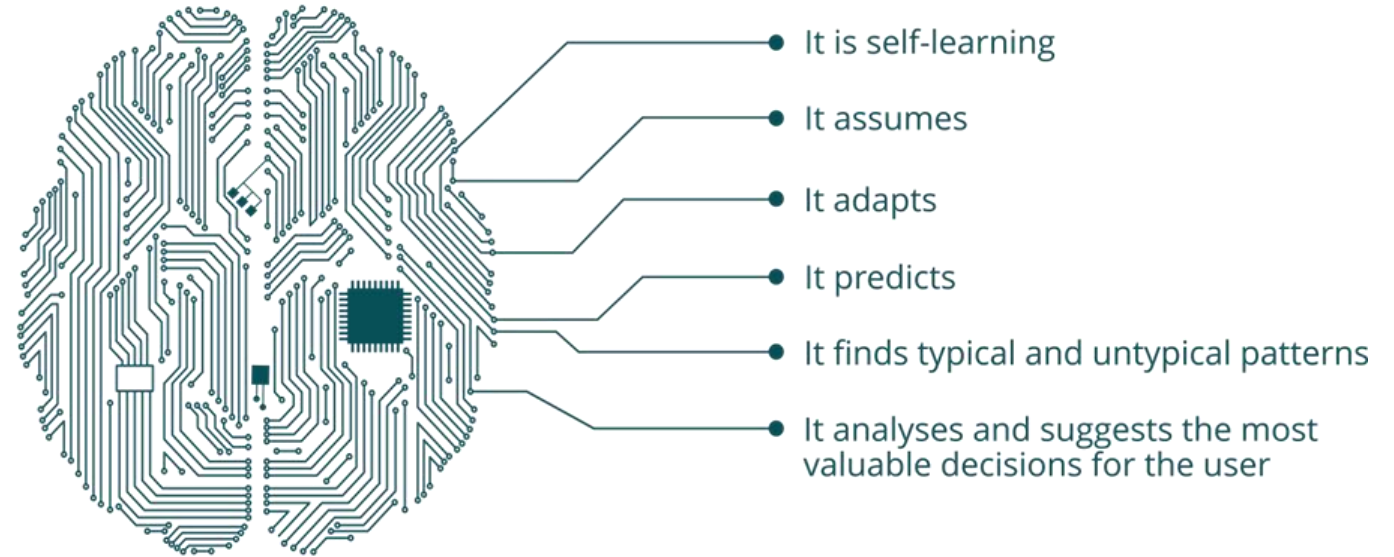
Connected References

The Container is, so far, the Most Intelligent 'Quantum Leap' in our Industry



Evolution and scale-up readiness was forgotten
in container shipping 'invention'

A.I. augmenting Human Intelligence



“A.I. deploys advanced analytical & learning capabilities to generate a intelligence able to anticipate & optimize – utilizing masive amounts of Data, understanding what is happening in very complex & changing environments”

Constant Change in a Plan 'B' Industry

Dealing with OPS scale and connecting multiple decision domains

How to **Vessel Plan** 18K discharges/loads within an acceptable lead time?

How to **monitor** 500 MPH in the **Quay** if the cranes' productivities are all different?

How to manage the unpredictable visits of 350 trucks per hour at the gate while minimizing **unproductive moves**?

How to deal with **yard allocations** if cargo demand in & out is changing all the time?

Even more important, how we make all those CHEs minimizing **Energy & Emissions** ??

And many more about **Customer Service**: predictable ETC, VIP containers, connect services, cargo traceability for security...etc. etc. etc. .

Dealing with “Murphy’s” and Plans B



“KEEP THE CALM & CARRY ON”

Planning quality determines highly performance and quality of service:

- A good Planner takes at least 2 years of good training and mentoring.
- Planning practice is TOS centric, while there are many “manual tweaks” outside system.

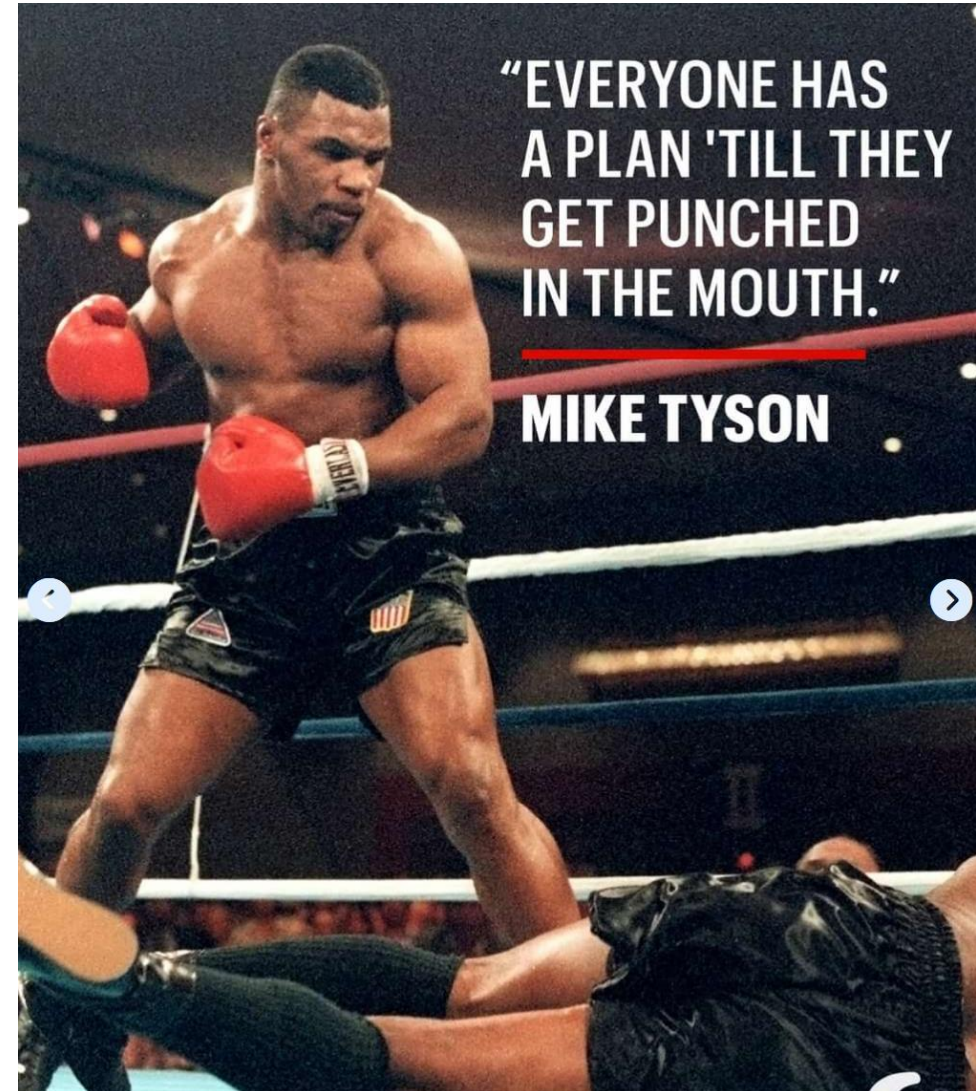
Source: PTI AI Webinar, 2020 Blog.

Dealing with “Murphy’s” and Plans B

Execution basically survives and pray not to have exceptions:

- Exceptions Handling is difficult and lacks awareness about Actions impact,
- Difficult to learn and factor most effective Actions into Future occurrences.

Source: Rich Ceci & Oscar Pernia, PTI 2017.



NextPort company vision and purpose



NextPort by Moffatt & Nichol

Strategic Investment in Technology & Innovation



moffatt & nichol



Customer Focus

Identified Opportunities at Ports & Terminals

Need to reduce cargo **turnaround times** based on connecting the different transportation modes and catalyzing synchro modality.

Need for digital **asset management** for improved resource allocation, utilization and infrastructure sustainable development.

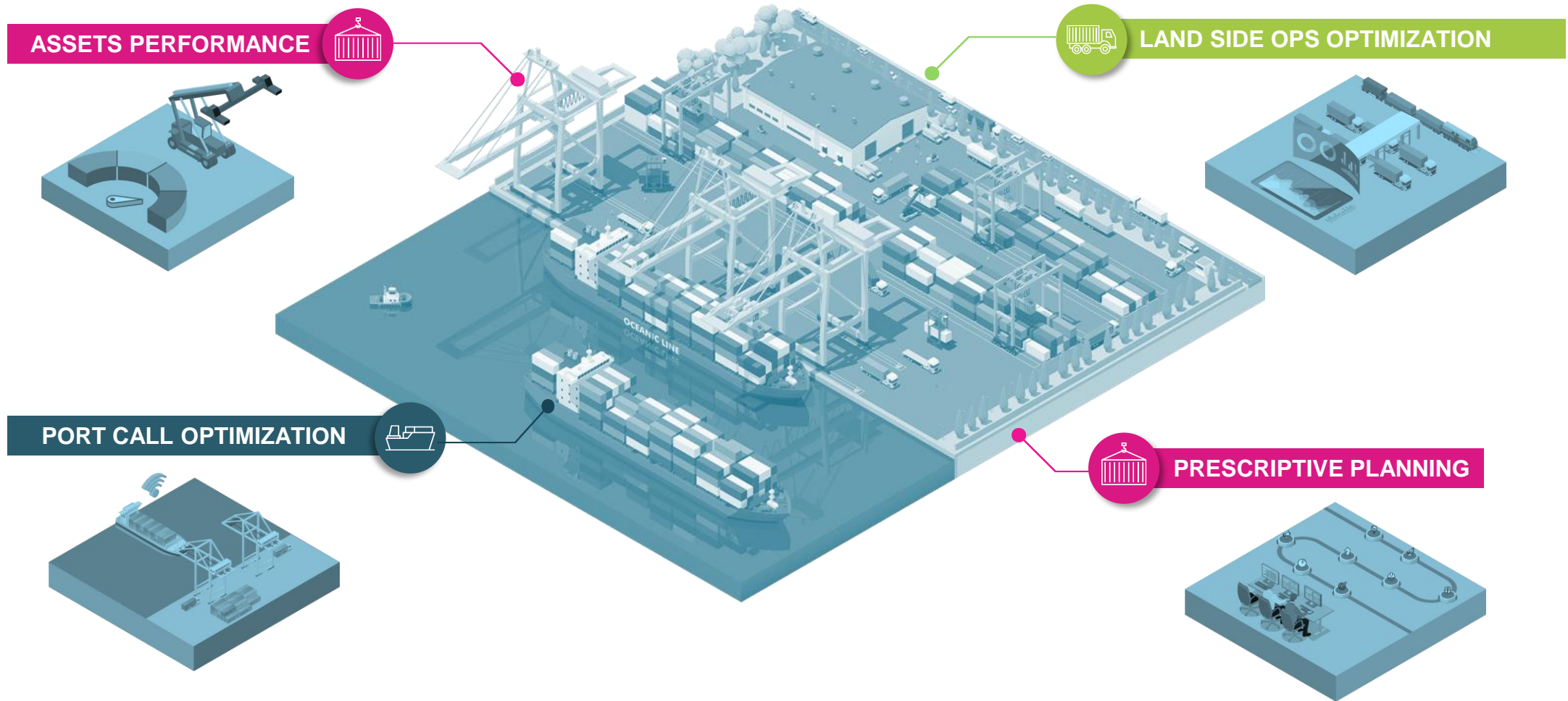
Need for compliance with **environmental regulation**, to support maritime decarbonization Agenda jointly with Port stakeholders.

Need to deliver more **value to Port stakeholders**, empowering Port community via its efficiency and resiliency to the Ports end-users.

Need for digitally **enhanced collaboration, flexibility and transparency** in its connection to the Supply Chain.



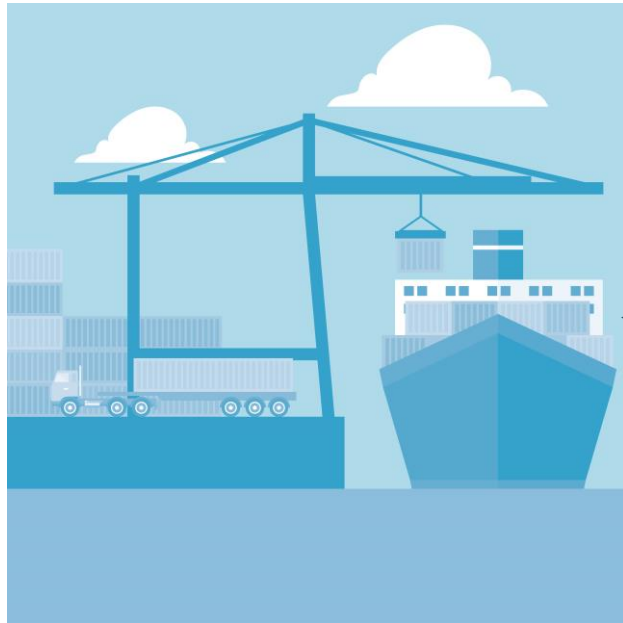
Key Focus Areas



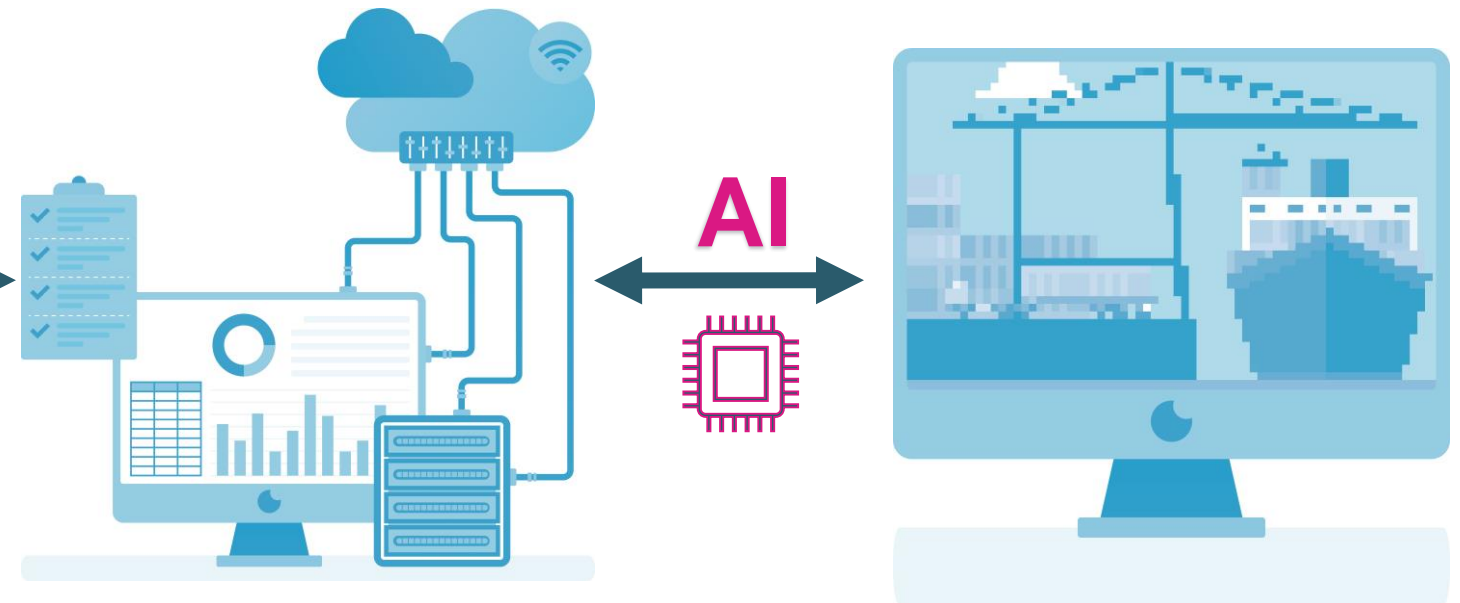
Our SmartPort Vision

Transforming decision-making at Ports and Terminals with Technology

PHYSICAL INFRASTRUCTURE



DIGITAL TWIN ENABLING DATA-DRIVEN DECISION MAKING



 **PROCESS UNDERSTANDING**



 **DATA INTEGRATION**



 **MEASURE & ANALYZE**



 **ANTICIPATE & OPTIMIZE**

NextPort platform provides data-driven decision-making capabilities and A.I. solutions, developed from deep-domain expertise.

Take UX to the next level in terms of Digital Tools and Data Analytics.



Holistic Digital Twin Monitor with Exceptions Handling assistant recommendations.



“What If Scenarios” simulations to instrument prescriptive planning.



Predictive and Prescriptive capabilities to help decision making.



Practical Cases of Study at Ports



Case Study Ro-Pax Operations

Problem Statement

Complexity of Operations during OPE time:

- Up to 8500 vessel calls
- 3,3M pax and 750K vehicles in 2 months
- Peaks of up to 11 rotations/berth/day

Any change at planning causes a spillover effect in the whole Port Operation, impacting **Control Room Users** with uncertainty and stress:

- Stakeholders sharing data and prognosis 'ad-hoc', with multiple manual calculations.



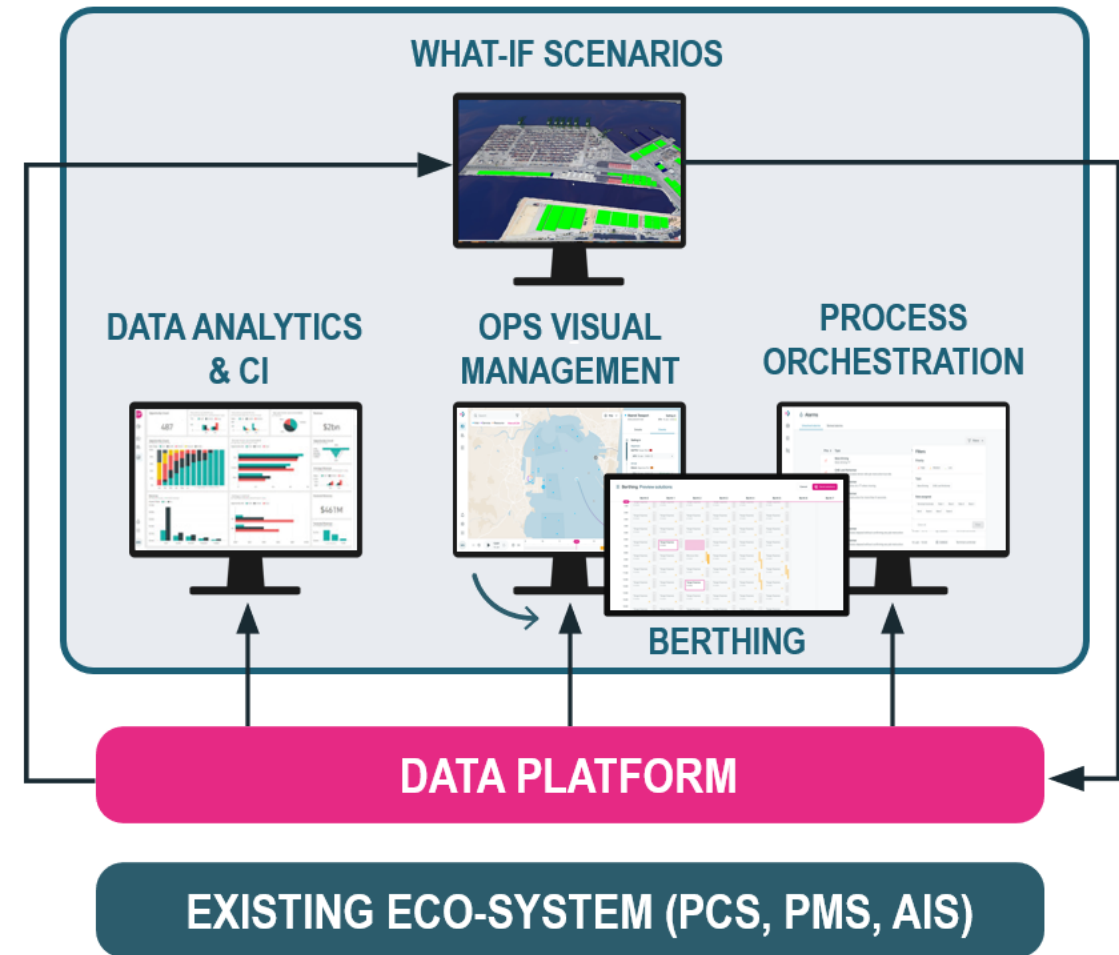
Case Study Ro-Pax Operations

Concept Solution

The combination of **multiple data sources** and enough historical baseline to generate a background learning ML process.

A **360 Digital Twin solution** providing:

- **Live Mirroring** Waterside Operation,
- **ML Prediction** to alert Berth conflicts,
- **Prescription** of potential Solutions,
- **‘What If’ analysis** of prescribed actions with Simulation for landside traffic.

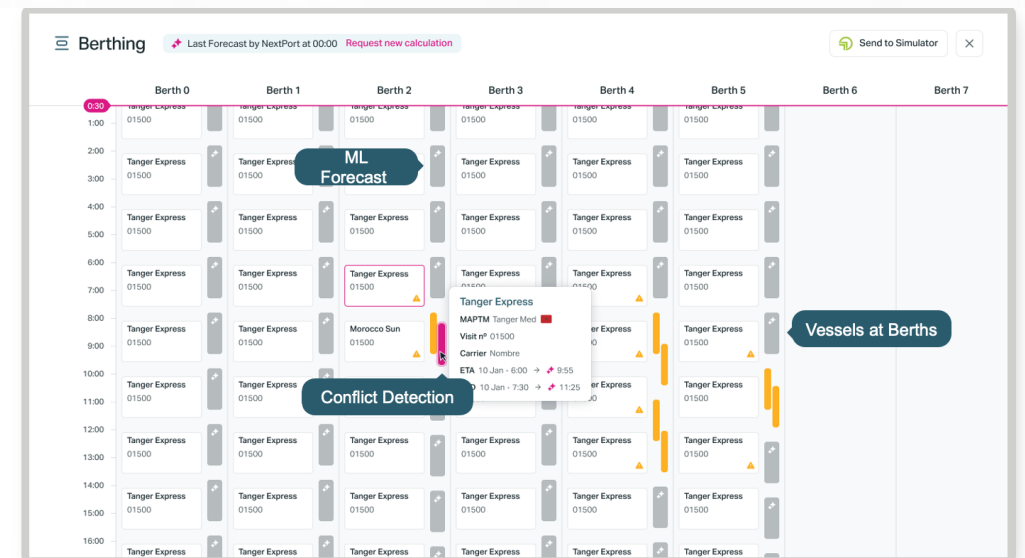


Case Study Ro-Pax Operations

Value Brought

Enhance control and collaboration across waterside and landside decisions, enabling **data-driven decision making**.

Continuous improvements and process-oriented focus at Control Center, generating significant benefits at **efficiency and sustainability**.

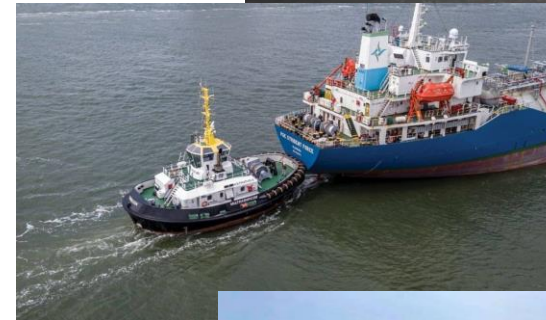


Case Study AIS Events Detection

Problem Statement

Visibility and awareness across vessel operations – multiple sources of info and **data quality** within a Port not an easy task: often data sources have **inconsistencies** or they are **incomplete**.

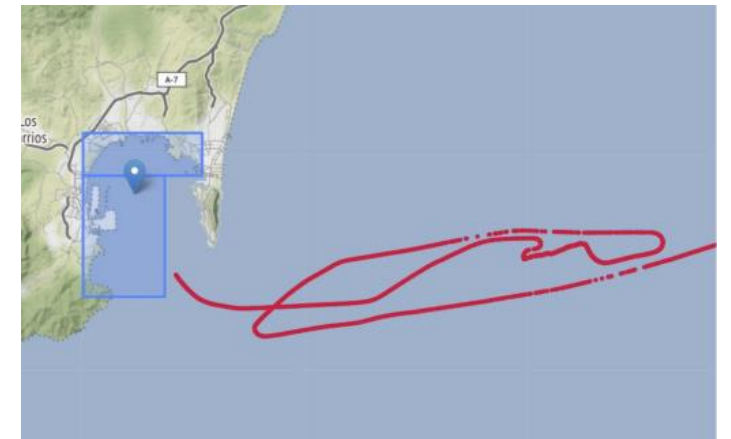
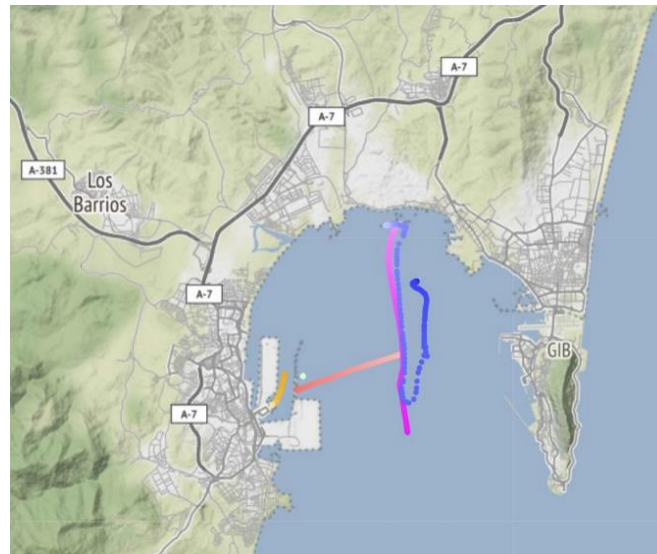
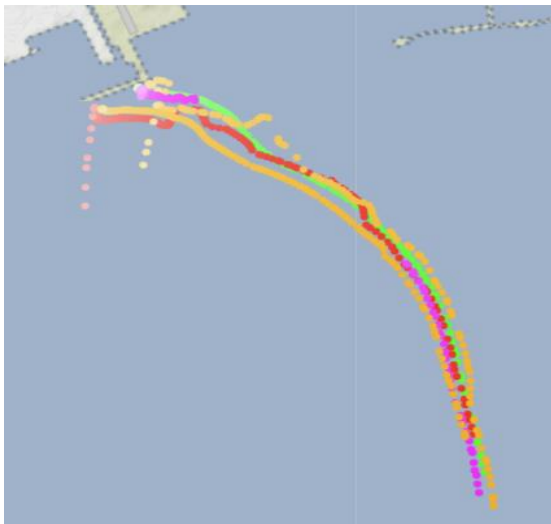
- ✓ Multiple concurrent services (tugs, pilots, barges...).
- ✓ Many Events manually triggered by users.
- ✓ Events created significantly after they happened.
- ✓ Events detection based on AIS can be complicated and usually have errors.



Case Study AIS Events Detection

Concept Solution

Apply **expertise in Ports** and **AI technology** to **analyze the behavior** of the different Port Events (berthing, anchorage, pilotage, towage...), and consequently create a specific **RT detection algorithm** for each of them.



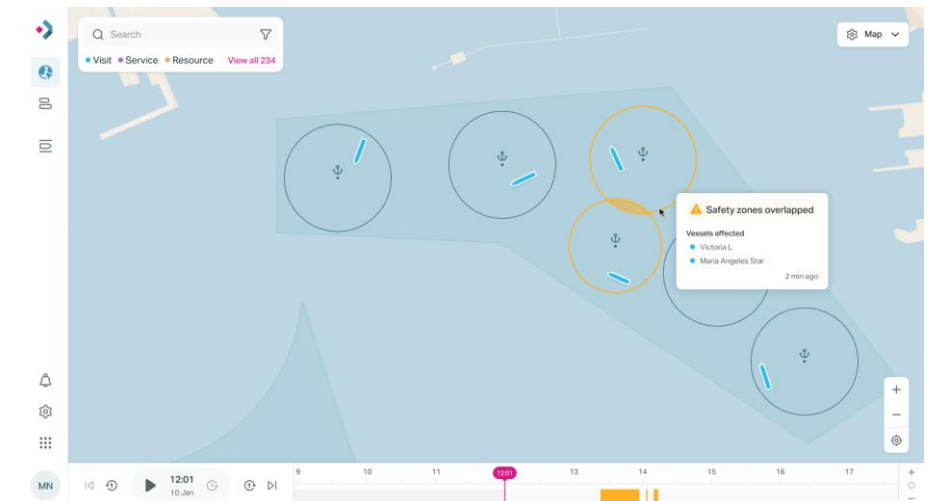
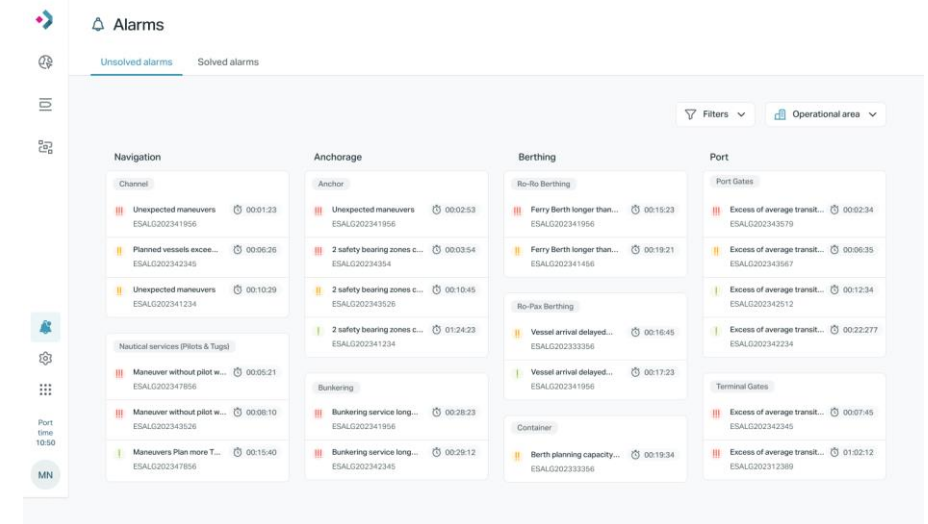
Case Study AIS Events Detection

Value Brought

Ability to **detect and generate Events** in every Port only using one global data source.

Improve **control** of the different **operations** within the Port and **visibility** of their **resources**, across stakeholders.

Enabling a **better understanding** of what is happening in the Port which will allow us to **anticipate** what will happen.



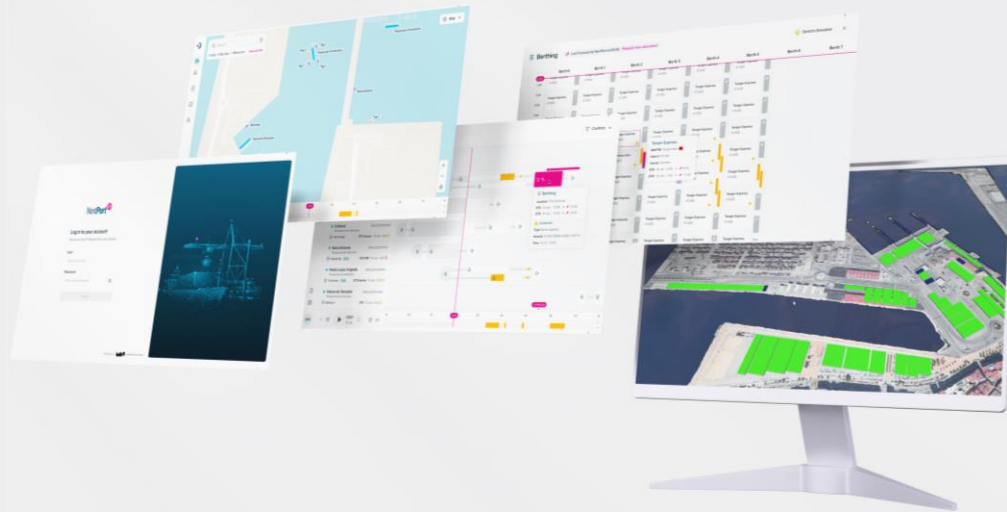
NextPort Solution Value Proposition



Assisting the Users with a 360 **Digital Twin Solution** that connects the dots across decision domains at Ports & Terminals



Ports & its Communities



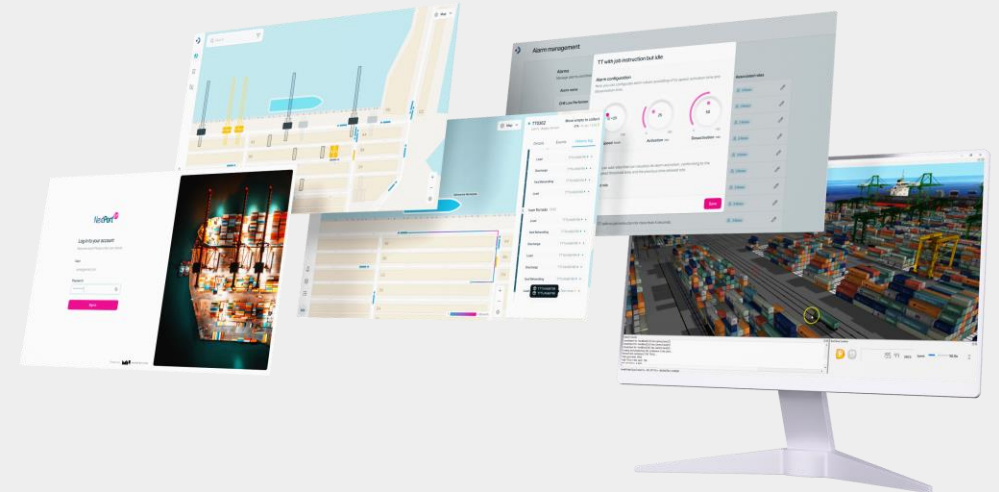
Real Time monitoring with exceptions handling



Predictive & prescriptive capabilities



Terminal Operators

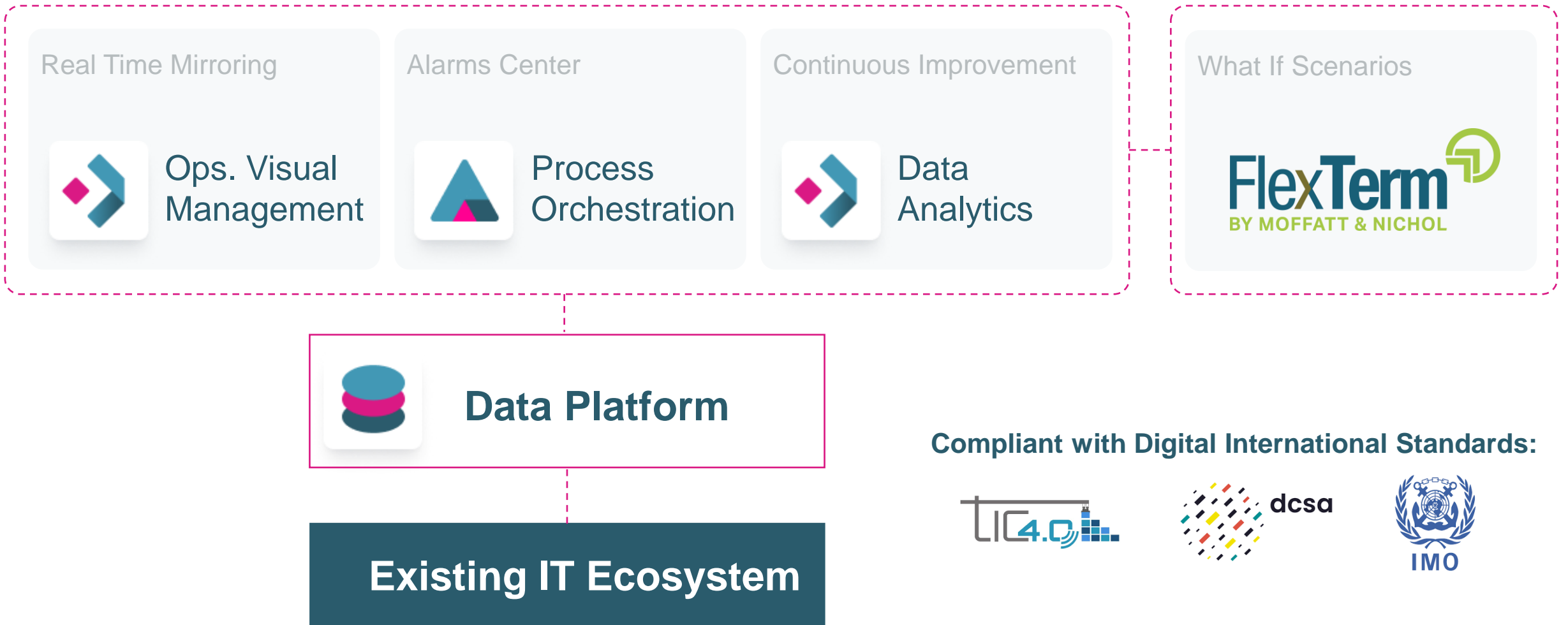


'What If' Scenario simulations evaluation



Next-level digital tools & data analytics UX

Digital Twin is the **Data** and its utilization



Operational Visual Management



Simplification

Simplified and visual user experience augments human decision-making.



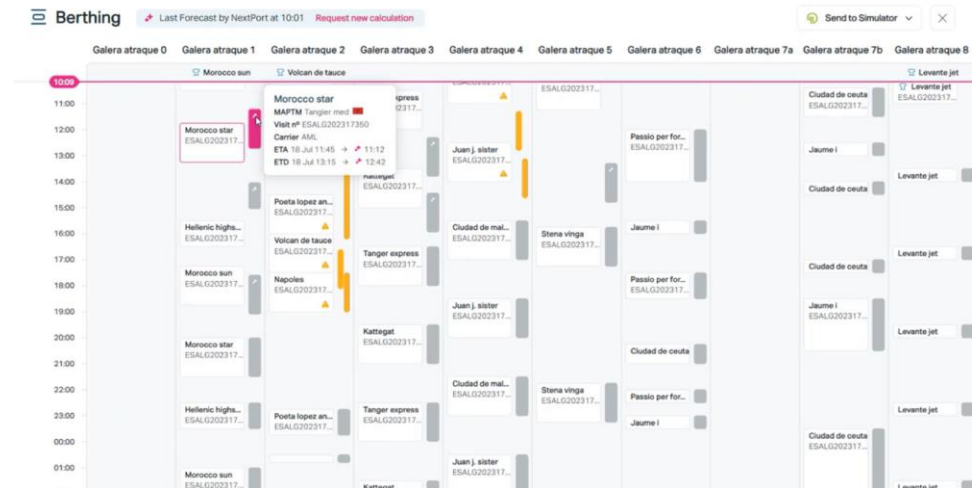
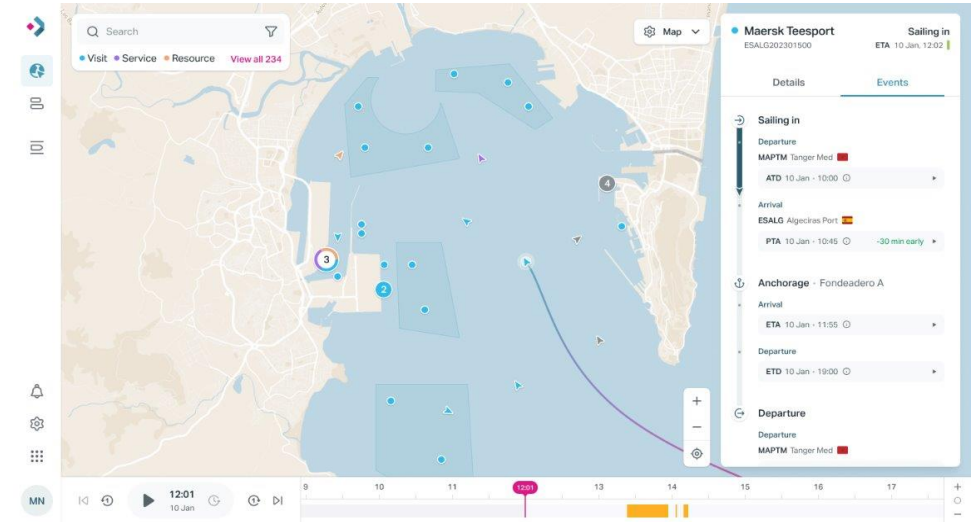
Continuous Analysis

Seamless integration with troubleshooting and continuous improvements.



Augmentation

Enriched data foundation for decision-making - more complete and precise context and visual experience.



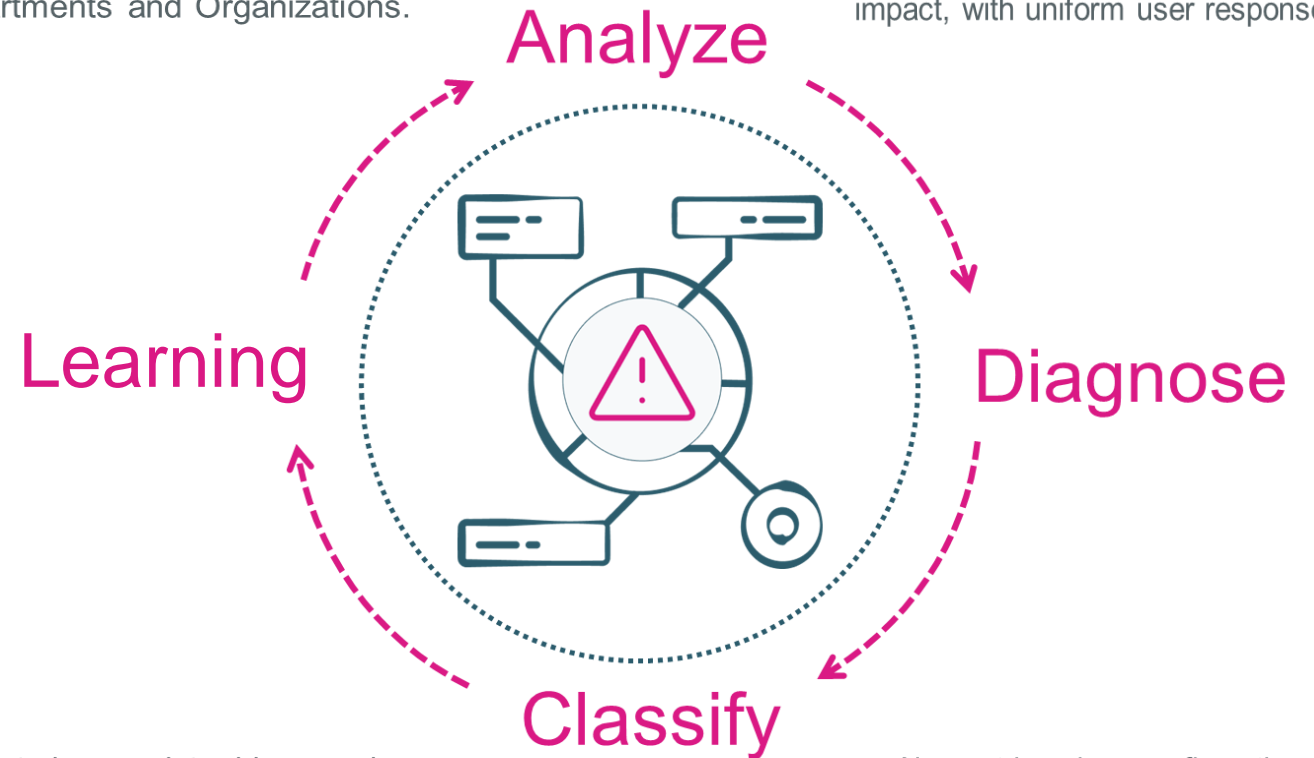
Process Orchestration (Alarms)



The screenshot displays a 'Process Orchestration' dashboard. On the left, a list of active alarms includes: 'Anchored vessel dragging', 'Two safety bearing zones conflict', 'Unexpected maneuvers', 'Ferry Berth longer than expected', 'Bunkering service longer than authorized', 'Planned vessels exceed capacity', 'Two safety bearing zones conflict', 'Anchored vessel dragging', and 'Unexpected maneuvers'. The 'Ferry Berth longer than expected' alarm is highlighted, showing details for vessel call ESALG202301500, zone Berth 1, and a trigger time of 7 Feb - 10:45. A timeline shows arrival at 09:30 and departure at 10:15. A warning indicates that if the alarm is not solved by 05:00, vessel ESALG20230193 will be delayed. Recommended solutions include reviewing the berthing plan and contacting the vessel operator. A map at the bottom shows the port area with various vessels and berths.

Alarms and workflows can be generated in real-time and across Departments and Organizations.

Diagnose more precisely. Actions that prevent performance impact, with uniform user response.



Control room data-driven and analytical approach, enabling Organizational evolution.

Alarms triggering, configuration, and classification - injecting a continuous improvement capability at execution.

Data Analytics & CI



Forecast & Predict

Cross-domain data analytics & forecasting, serving both planning and execution.

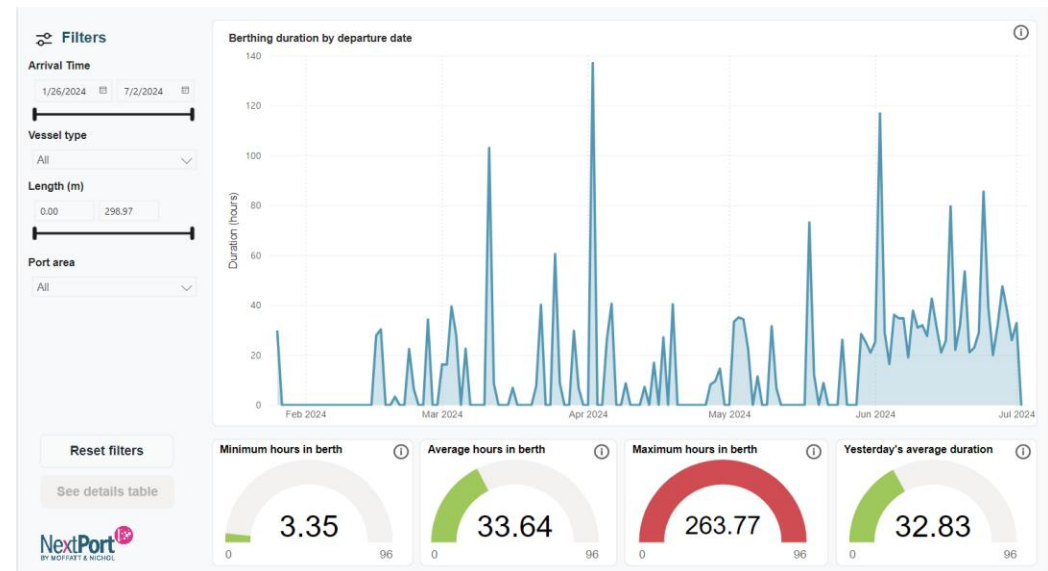
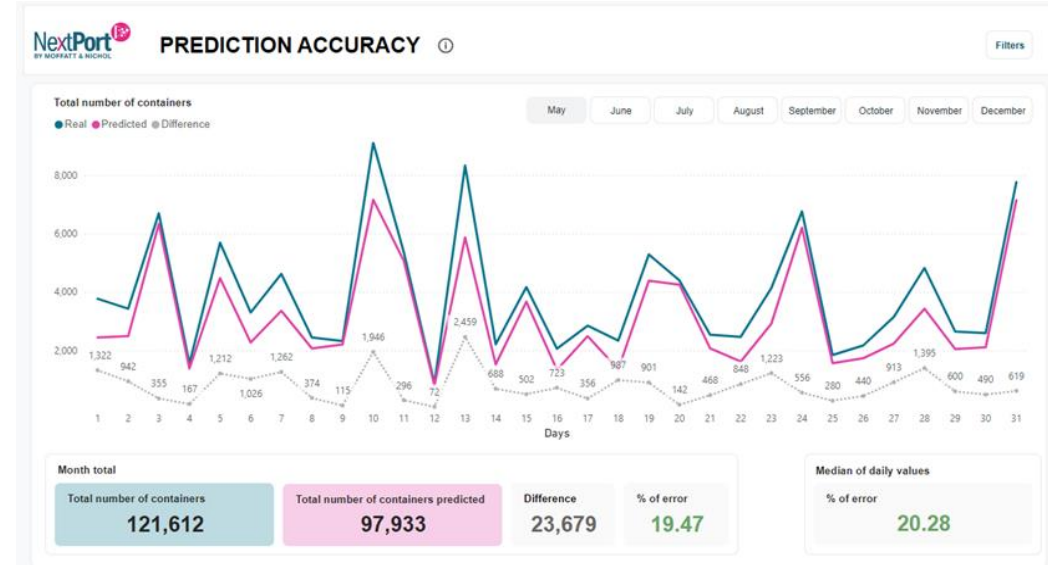
Troubleshoot & Learn

Deep analysis of trouble-shooting and user behavior to improve exceptions handling and contingency management.

Root-cause Analysis

Clearly identify efficiency opportunities, including energy usage and emissions.

Data-driven Decisions





NextPort 
BY MOFFATT & NICHOL



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