

12.10.2023

Port Call Digitalization and Shore Power Solutions

Results of the Living Lab Application Scenario 2B

IW-NET Final Event, Ghent



Arne Gehlhaar





Our Visions and Innovations:



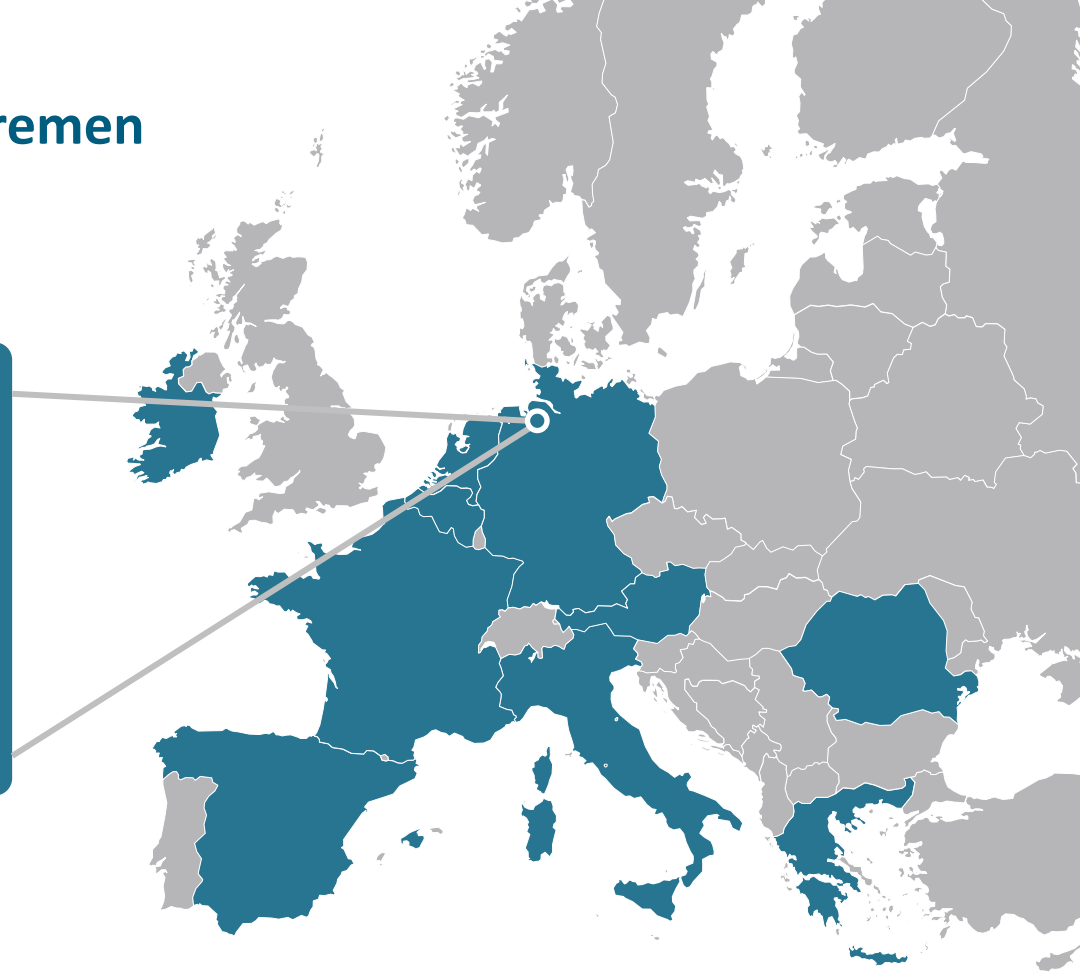
**Digitized and optimized port
business processes and
infrastructure management**



Application Scenario: Ports of Bremen

Twin Ports: Bremen and Bremerhaven

- Among Europe's most important universal ports for containers, vehicles, general and bulk cargo dangerous goods and project cargo
- Mixed-use by seagoing and inland vessels
- Hinterland link via River Weser (TEN-T North Sea – Baltic; Orient/East - Med)
- Main infrastructure provider: bremenports GmbH & Co. KG



Application Scenario: Ports of Bremen

Current Situation

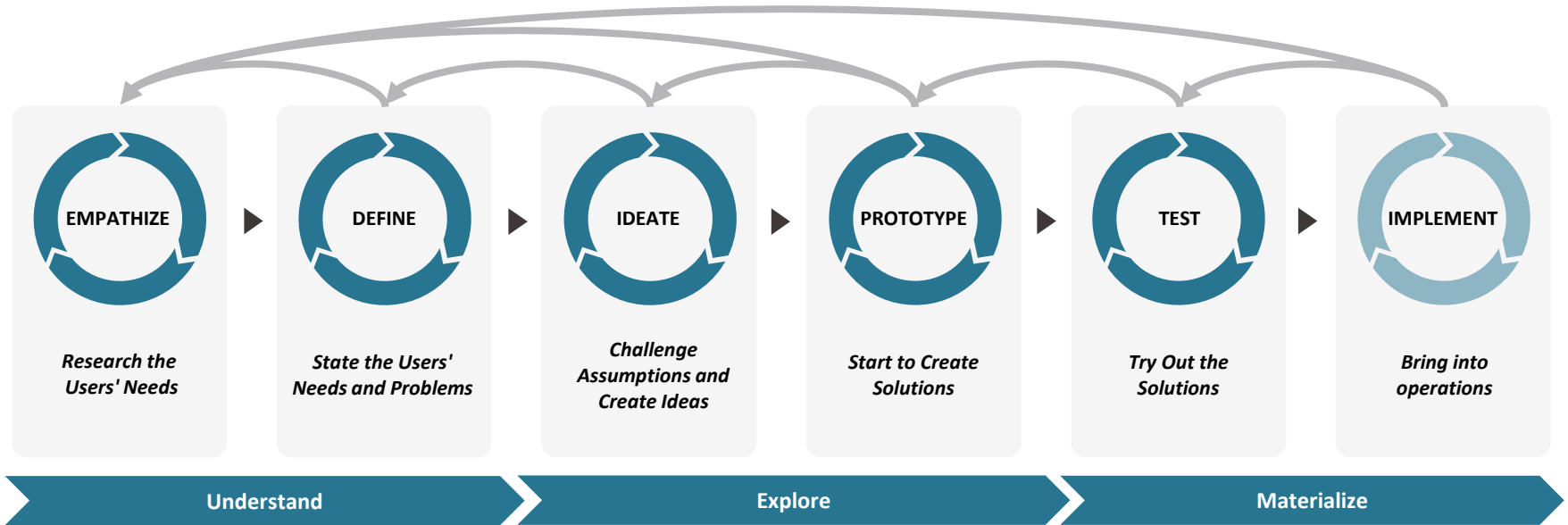
- Communications between port authority and barge operators carried out on short notice via VHF or email
 - Adhoc berth/lock planning
 - Incomplete an error-prone data collection
- Provision and use of shore power
 - 23 berths equipped with shore power facilities
 - Skippers need to pick up keys at port office
 - Manual meter readings

Consequences

- High administrative burden for barge operators → Operational Costs
- Lack of transparency → increased communicative effort
- Data quality issues → high effort for port authority (e.g. for invoicing)
- Lack of visibility for monitoring and control of real shore power usage
- Use of shore power is inconvenient/burdensome



Our Research Journey



Key Stakeholders and Users



IWT Operators

„decision support before, during and after the port stay“

- digital port call announcements
- information and transparency during the port call process
- convenient shore power access



Port Traffic Coordination

„Earlier and more reliable planning information on inland vessel port calls“

- Receiving and processing of digital port call announcements within VTMS
- Integration and consolidation of different data sources



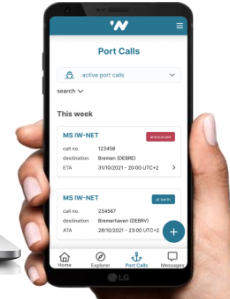
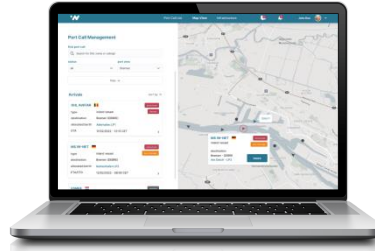
Infrastructure Management

„cost-effective monitoring of infrastructure facilities“

- remote control and monitoring of shore power facilities
- Integration of additional infrastructure objects such as water meters, pumps, leak detection etc.

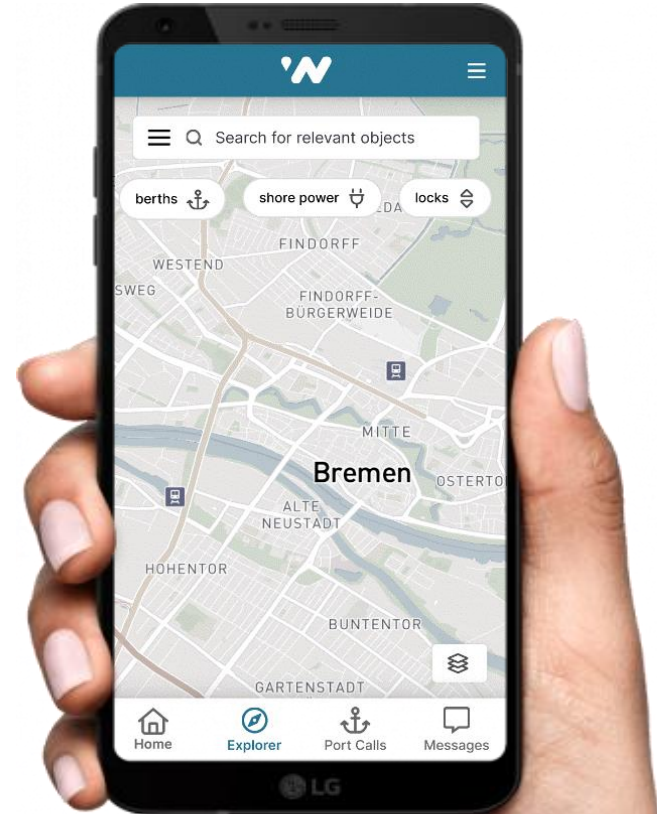
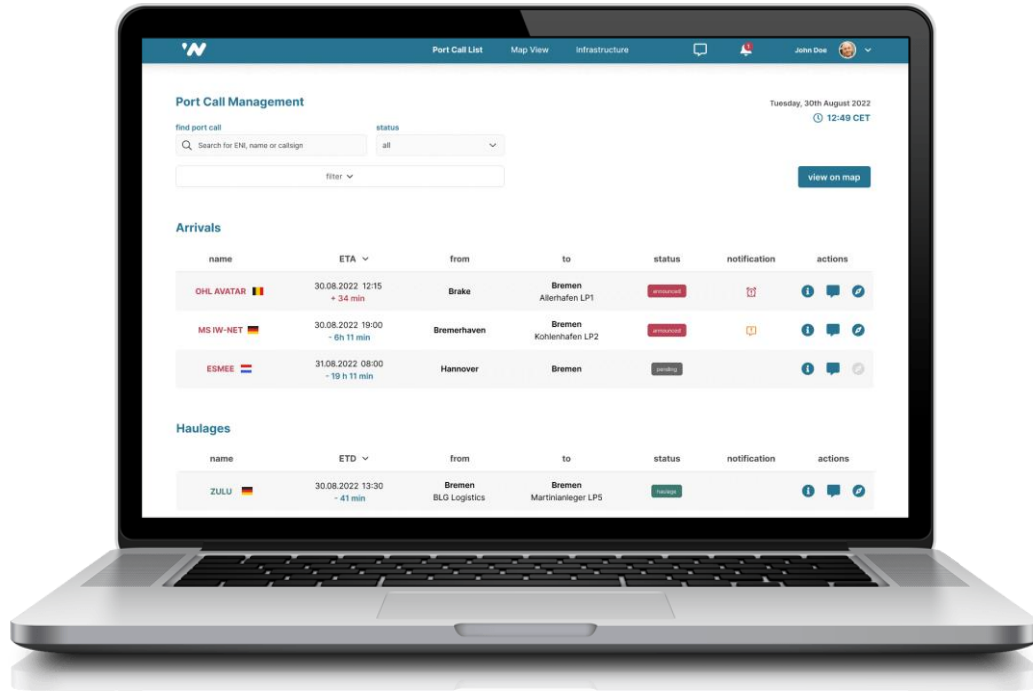
IW-NET Innovations

bremenports
:



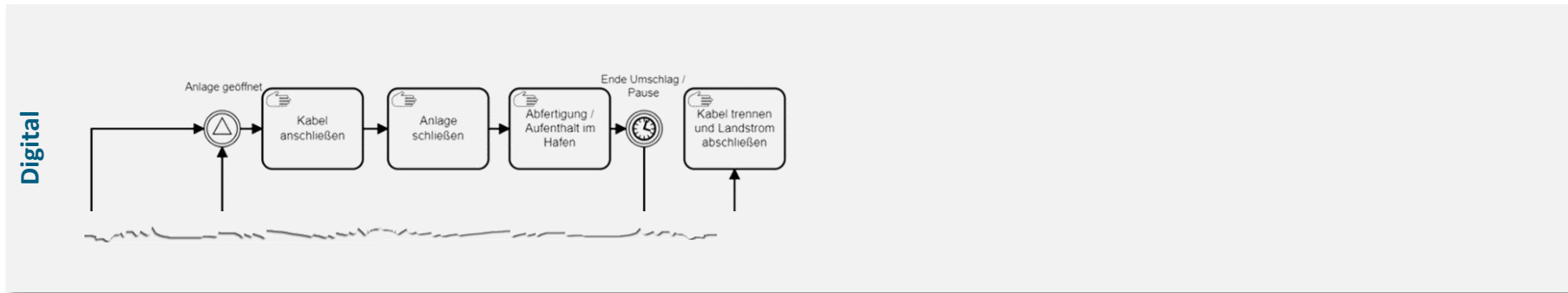
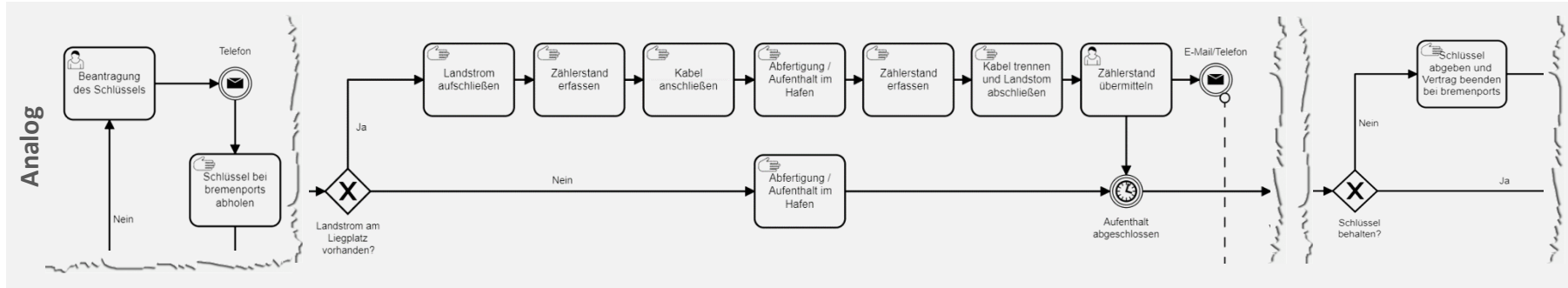
Institute of
Shipping Economics
and Logistics

„Going Digital“ throughout the Port Call



Digitalization Allows for Seamless Processes

Example: Access and use of shore power



Efficient Infrastructure Management within the „Internet of Things“

IW-NET Shore Power Solution

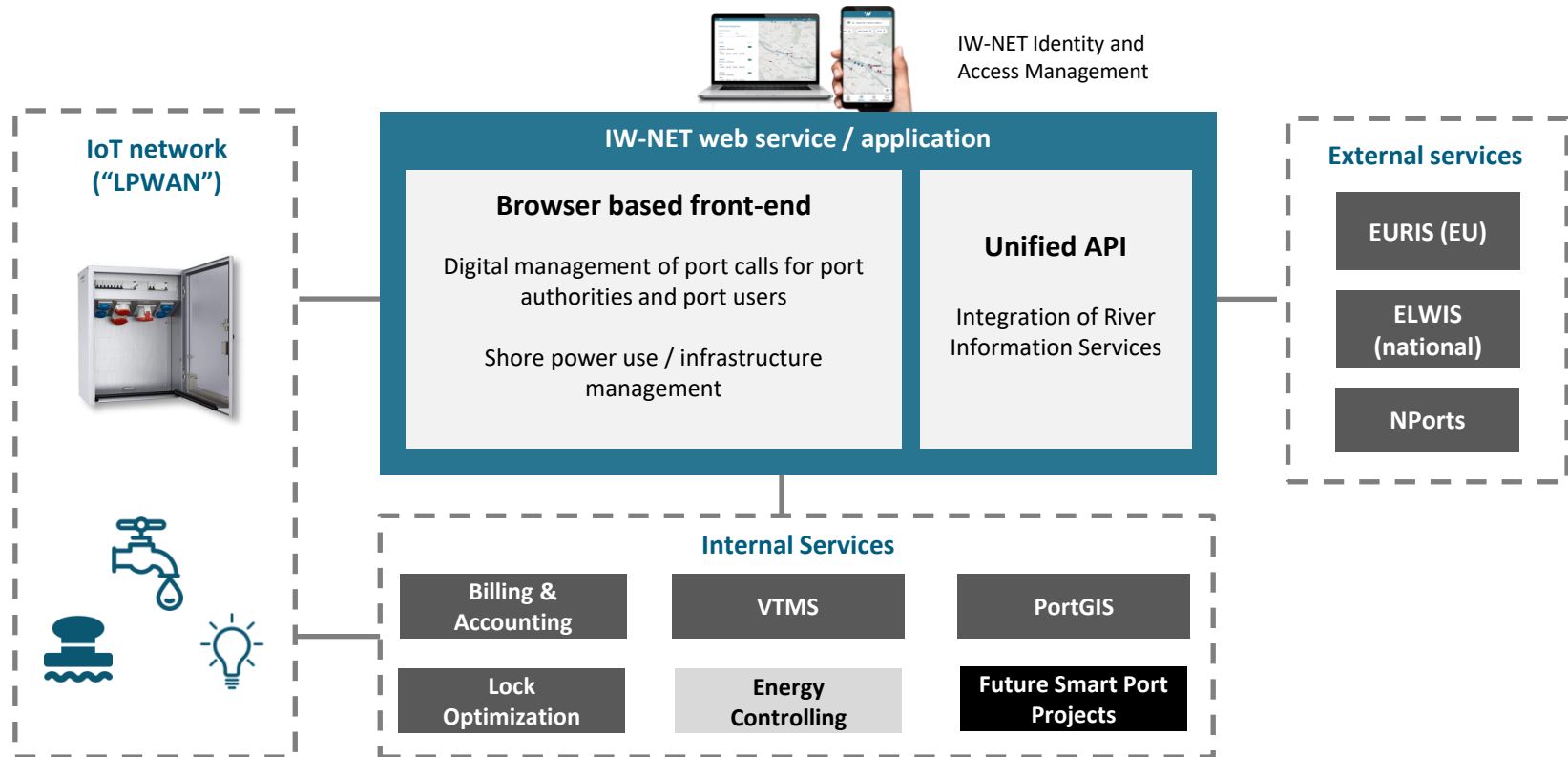
- Access control and detection of the door closing status
- Recording and transmission of meter readings
- Communication with external systems via web interfaces

Why not something "off the shelf"?

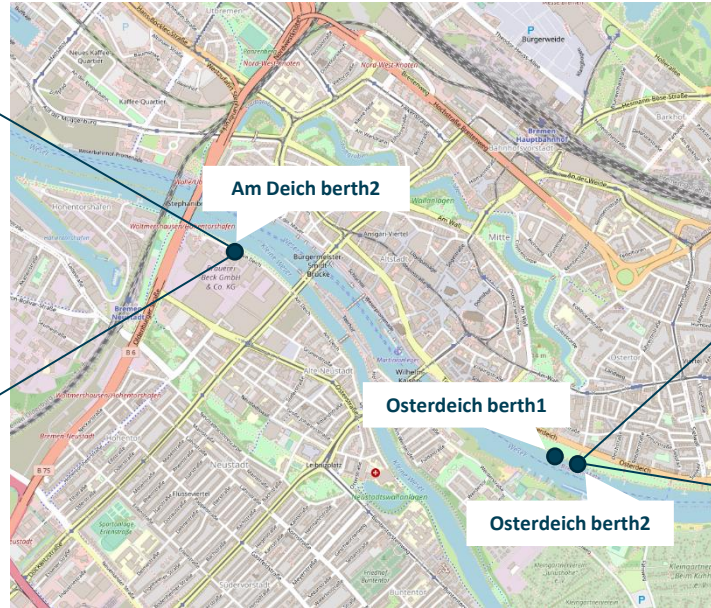
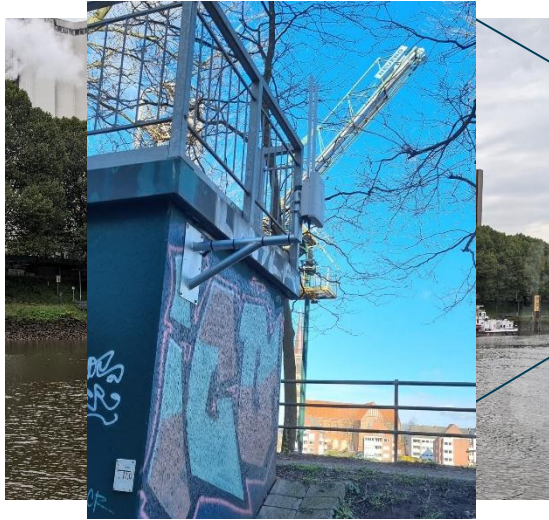
- Need for cost-effective retrofit solution for existing plants
- Direct link of port call management and access authorisation enables use and billing without additional payment systems
- Full control of communications network allows to easily integrate additional sensors



Blueprint for Future Smart Port Solutions



Pilot Installations in the Port



Field Tests in Bremen

Trial run with Bremen Port Authority vessel

- Real-life Tests in mid September 2023
 - ISL
 - bremenports
 - dbh (VTMS IT-provider)
 - Port Authority
 - Governmental representative
- Bremen Port Authority Vessel “Hafenamt 1”
- Test run of Digital Port Call in combination with Shore Power Solution

Results

- Proof of concept – IW-NET solution successfully demonstrated
- Valuable feedback regarding usability and some technical details



Outlook

Field testing continuing

- IW-NET web application test installation
 - Interface to local VTMS set up
 - Integration of lock optimization & decision support system “Tide2Use”
- Installation of IW-NET shore power station and LPWAN within port of Bremen

Transferability challenges

- Create acceptance and get affected stakeholders "on board"
- Business model evaluation
- Transferability to other corridors

Laying the Foundation for Smarter Port Services

- Process digitization data foundation for future port services
- Further applications for the established IoT network already in the starting blocks
- Flexible and service-oriented IT architecture as a blueprint for future smart port services

