I²PANEMA

Smart IoT solutions for ports paving the way towards PI nodes

ITEA 3

Agenda

1. Project and consortium introduction
2. Business scenarios
3. I²PANEMA & Physical Internet
4. Reference architecture
5. ISO standardization

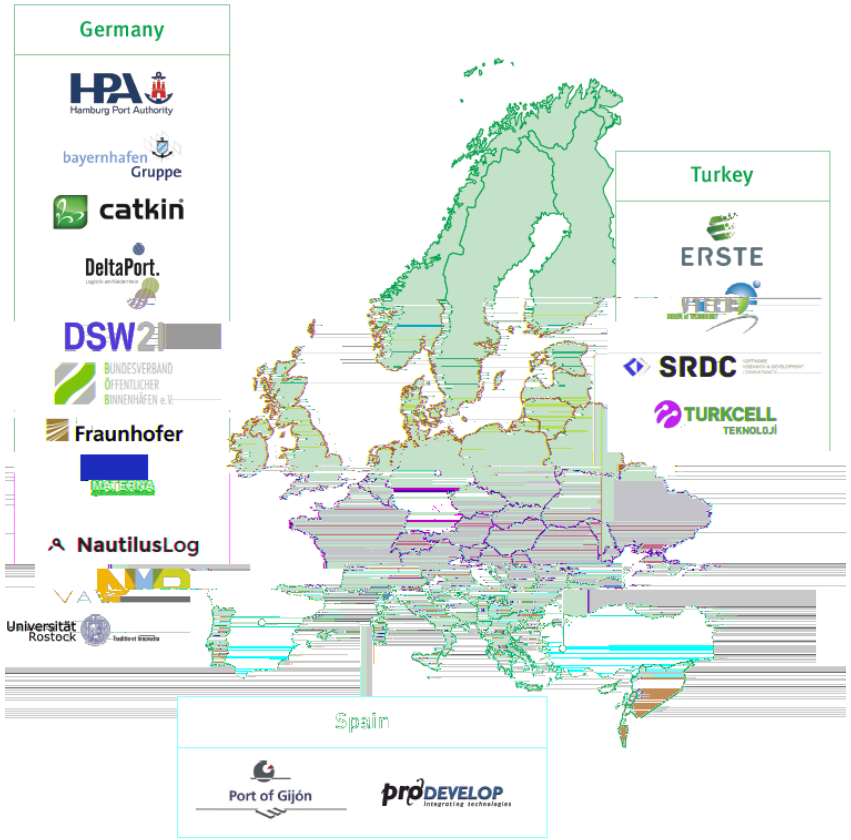
What is I²PANEMA about?

- Intelligent IoT-based Port Artefacts Communication, Administration & Maintenance (I²PANEMA)
- Recent IT innovations have not yet fully arrived at the world of ports
- I²PANEMA will bring IoT solutions and IoT based value-adding services to the world of ports
- Among others providing corresponding proof-of-concepts by way of application experiments in various selected business scenarios

➔ Implement IoT standards and promote the use of IoT technologies

➔ Digitize processes in ports and help to transform from logistics nodes to PI nodes

➔ Make port operations more efficient and sustainable by use of IoT



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9 Business Scenarios

Picture source: Fraunhofer IML

I²PANEMA & Physical Internet

- Physical Internet (PI) is a concept for an optimized, standardized global goods transport system based on the idea of the digital Internet
- In PI ports, the operations are standardized and the usage of a family of standard and interoperable modular load units from maritime containers to smaller boxes is extensive
- Services in PI nodes are visible and digitally accessible and usable including planning, booking and execution operations

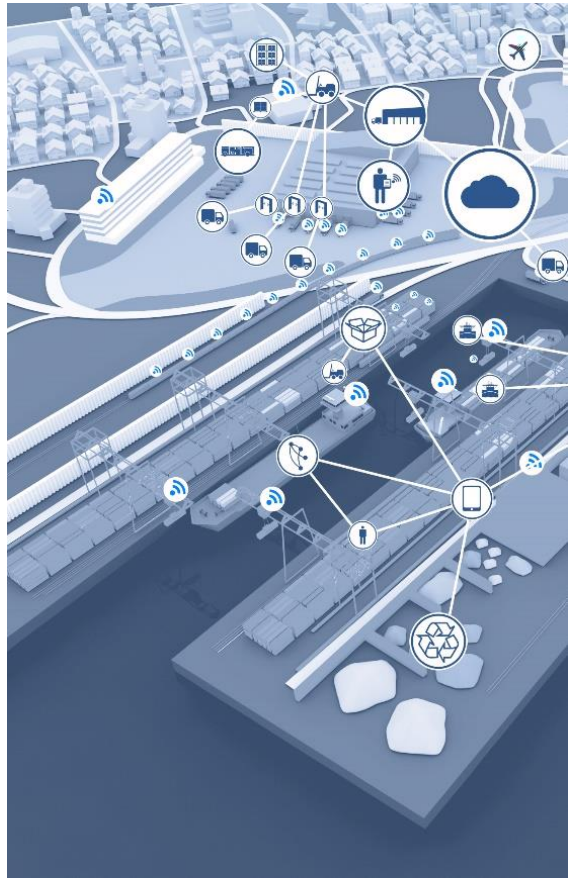
➔ The project aims to implement the physical internet in ports by

- ➔ connecting processes and stakeholders along the ports supply chain
- ➔ increasing the efficiency
- ➔ standardisation of interfaces and architecture
- ➔ and focus on sustainability measures

Picture source: Fraunhofer IML

I²PANEMA & Physical Internet

- I²PANEMA helps ports to digitize their processes and transform from logistics nodes to PI nodes
- I²PANEMAs business scenarios support the development of the Physical Internet and create additional services in ports like
  - improve efficiency and automation by traffic and transport optimization (Dortmund)
  - efficient logistics in urban areas through Active Noise Control (Nuremberg)
  - information flow of the complete transport chain will be addressed by using IDS
  - smartPortShip scenario aims at automated and standardized information flow for better planning



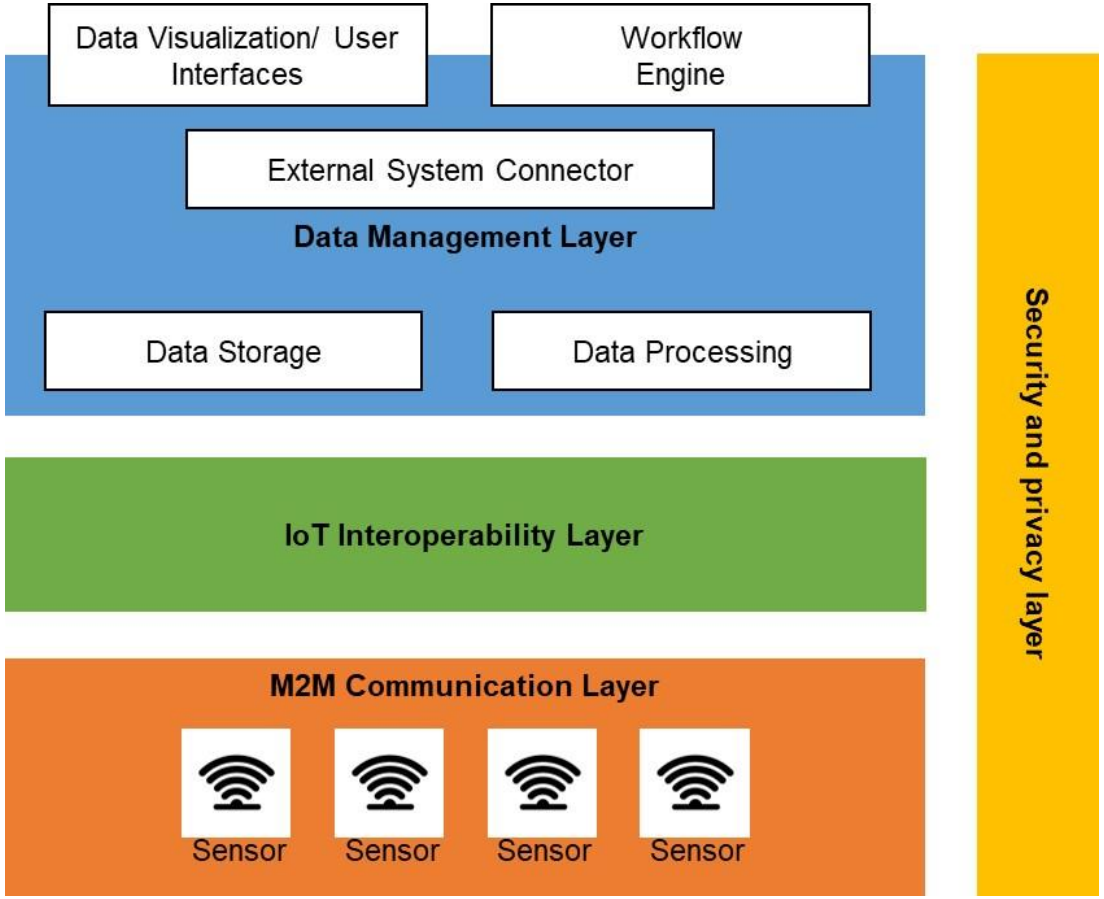
Picture source: Fraunhofer IML

System architecture

- The reference architecture designed within the project, is specified for ports, based on the industry standard Rami 4.0
- Supports the implementation of IoT based structures in ports and reduces innovation barriers
- Use of open-source technology wherever possible to simplify / enable adaptation and individual use

➔ Simplified implementation of IoT solutions through standardization

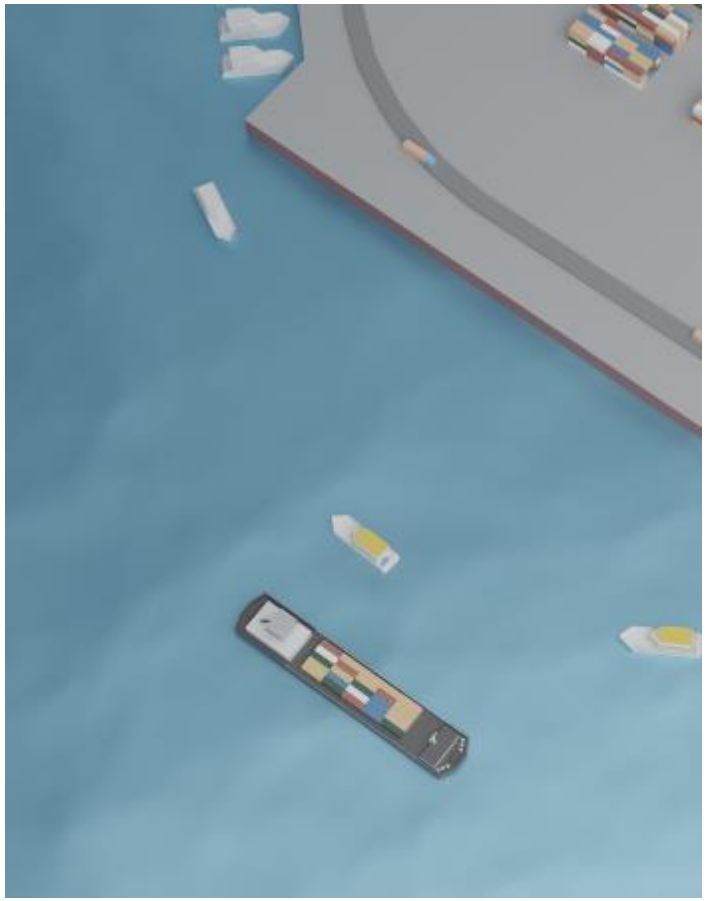
➔ With the development of a reference architecture, the project helps other ports to realize IoT projects



ISO-standardisation

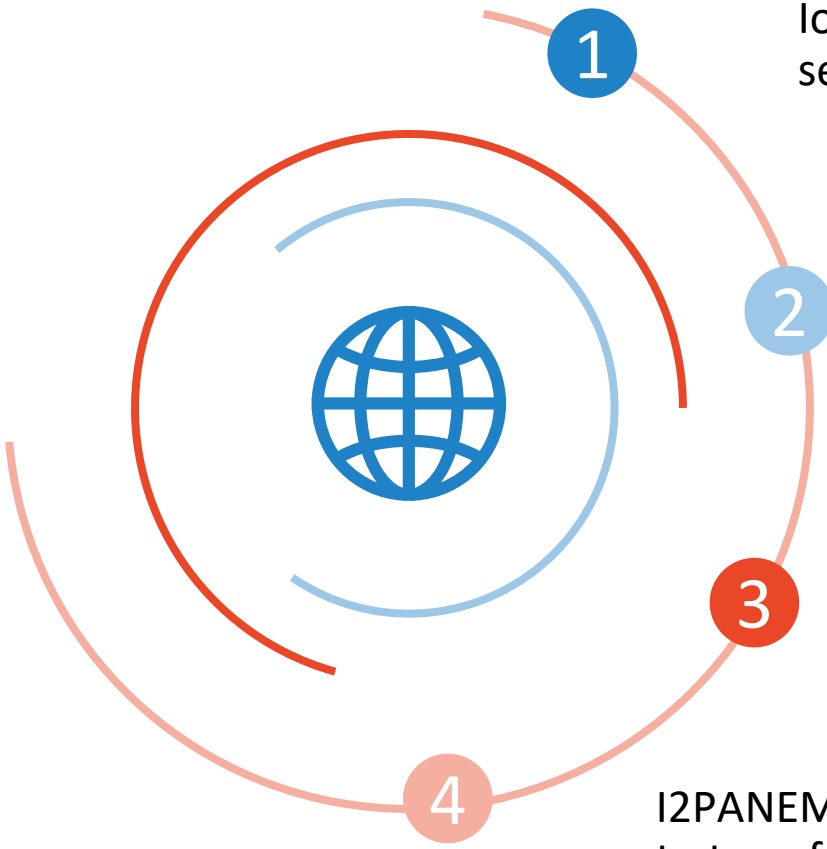
- To standardize the Smart Ship / Port business scenario the ISO norm 4891 was developed with the help of I²PANEMA
- The general goal of the ISO norm is to
  - improve safety on board and shore through increased data availability
  - create a standard that helps to generate logbooks for smart devices
  - fulfill new environmental requirements by connecting new applications

➔ Transparent and consistent information flow by standardization along the complete maritime based transport chain



Picture source: Fraunhofer IML

Conclusion



1. IoT devices allow to digitalize processes in inland- and seaports by using new IT strategies
2. connecting processes and stakeholders along the ports supply chain leads to increased efficiency and sustainability
3. Using IoT, GAIA-X and IDS can transform ports into PI nodes, interactive and digitized hubs
4. I2PANEMA shows the potentials of Internet of Things in ports to transform into PI nodes

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