ICT solutions for more efficient maintenance and management processes in Ports

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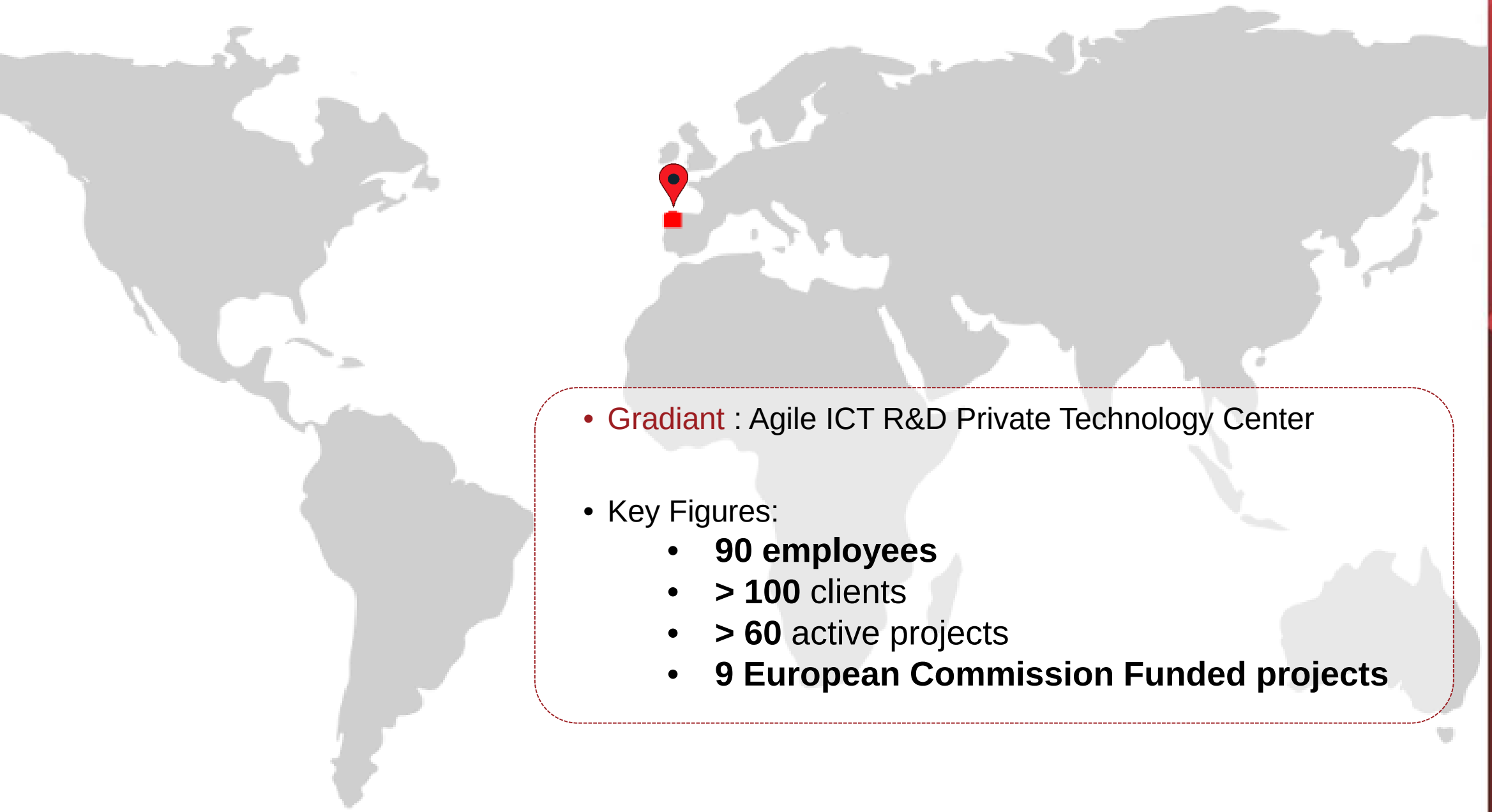
Gradiant



- Gradiant : Agile ICT R&D Private Technology Center

- Key Figures:
  - **90 employees**
  - **> 100** clients
  - **> 60** active projects
  - **9 European Commission Funded projects**

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Gradiant: What we do

S

security

- Multimedia Security
- Cloud Security
- Privacy Protection
- Privacy by Design
- Document traceability and watermarking
- Biometrics

I

intelligence

- Location and positioning
- Data Analytics
- Cloud Management
- Easy Cloud
- Advanced Backup and monitoring systems
- Augmented Reality and Geolocation
- Learning Analytics and Adaptative Learning
- Intelligent Vídeo Analysis
- Man-Machine Interfaces
- Bioinformatics

C

connectivity

- IoT (Internet of Things)
- Communication Subsystems
- Integrated and Onboard Systems
- Networks
- Wireless Communications

How can we use ICT for the Port? Ideas for a proposal

Objectives

Automate, optimize and simplify port processes and data management

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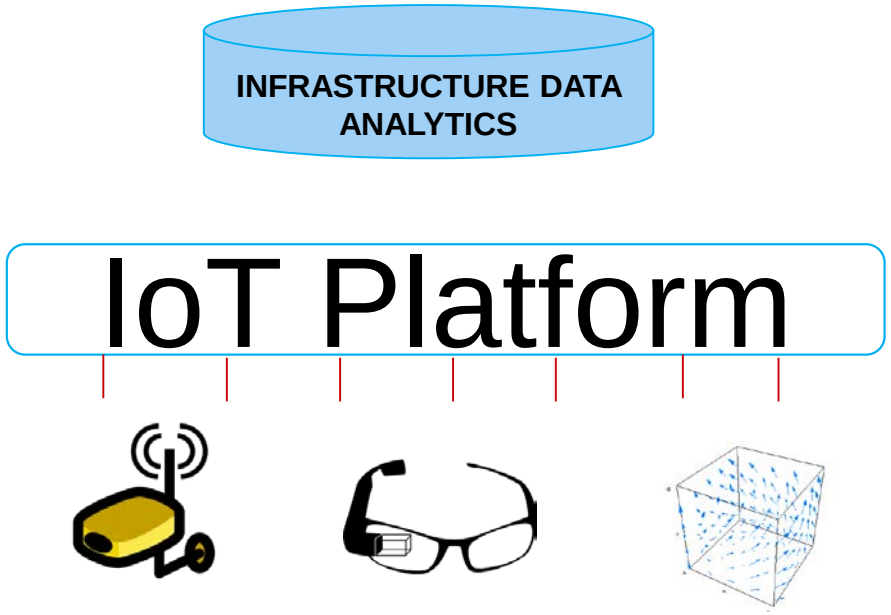
Port

Unify into a unique platform different technologies that can be applied to monitor and help in several maintenance tasks and management processes.

In order to verify that the port's infrastructure is correctly maintained, and that the processes are followed appropriately, specialized workers are required to review the state of the infrastructures and the processes. In order to optimize the time spent in maintenance and management we propose:

1. Deploy sensors in the port and allow the workers to visualize through 3D representations if any actuation is required in real time.
2. Increase port management intelligence using Big Data technologies and Machine Learning algorithms.
3. Integration of our solutions in the BPM application, improving the interface of port operations and the rest of the logistics supply chain



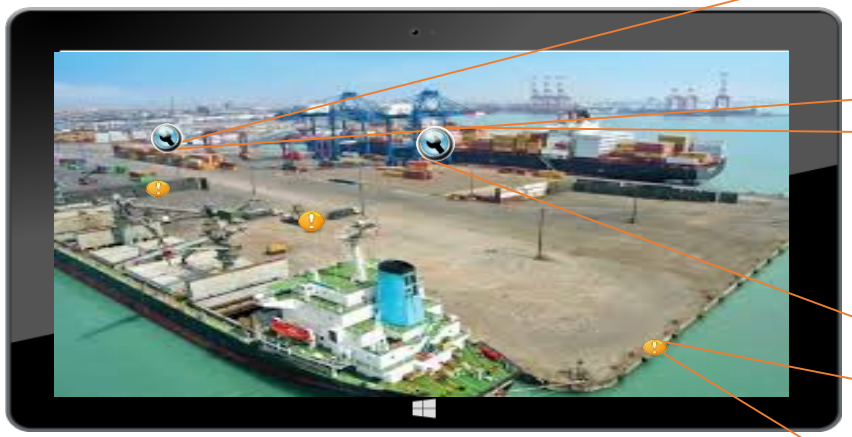
Vertical applications identified

- Logistics management
- Specific sensors
- Support in infrastructure maintenance through the use of Smart glasses
  - Tutorial videos
  - 3D representations

Port

APPLIED TECHNOLOGIES FOR SAFETY PORT INFRASTRUCTURE

PORT



LOGISTICS
management

Augmented reality
Support for
maintenance

MONITORING
of infrastructures

USAGE Statistics
DESIGN improvement

Ship

It is interesting to optimize the time required for vessels docking, logistics and trazability of the load. We propose an innovative Vessel Traffic Management system with the following features:

- Integrated ICT and ITS solutions for more efficient planning and routing of the cargo, along different transport modes
- A web-based system for port-networking to identify and exchange vessel locations, planned routes, cargo facilities and dates and times of movement, along with a database system to interface port/ship with new ways of simplifying docking paperwork and reporting, as well as customs operations
- A simulation-based decision support system for the optimisation of routes and timetables, according to information from all interested stakeholders (ports, ships, etc.)
- e-Navigation methods, using Augmented Reality solutions, for safer and more automated vessel movement while inside or entering/exiting the port

- ***The proposed solution is useful for both port authorities, ships, ship owners and ship registries***

Ship

The E-Navigation module

- Augmented Reality features to aid navigation in port waters and inland waterways via virtual shipping lanes implementation and sign generation for safer piloting
- Smart Window (or similar) device will be used to provide real-time information to the pilot/shipmaster to prevent incidents e.g. while manoeuvring
- Information concerning the condition of the ship will be transmitted in real time to the harbour master or port authority to ensure immediate reporting of an incident

Consortium

- **Possible Consortium Structure**

1. Software solutions for logistics in ports.
2. Mapping company
3. AR application developer
4. BPM developer company
5. Innovation Mgmt / DEC activities
6. End users – port authorities
7. Monitoring solutions for infrastructures
8. Sensor providers
9. 3D design and simulation company

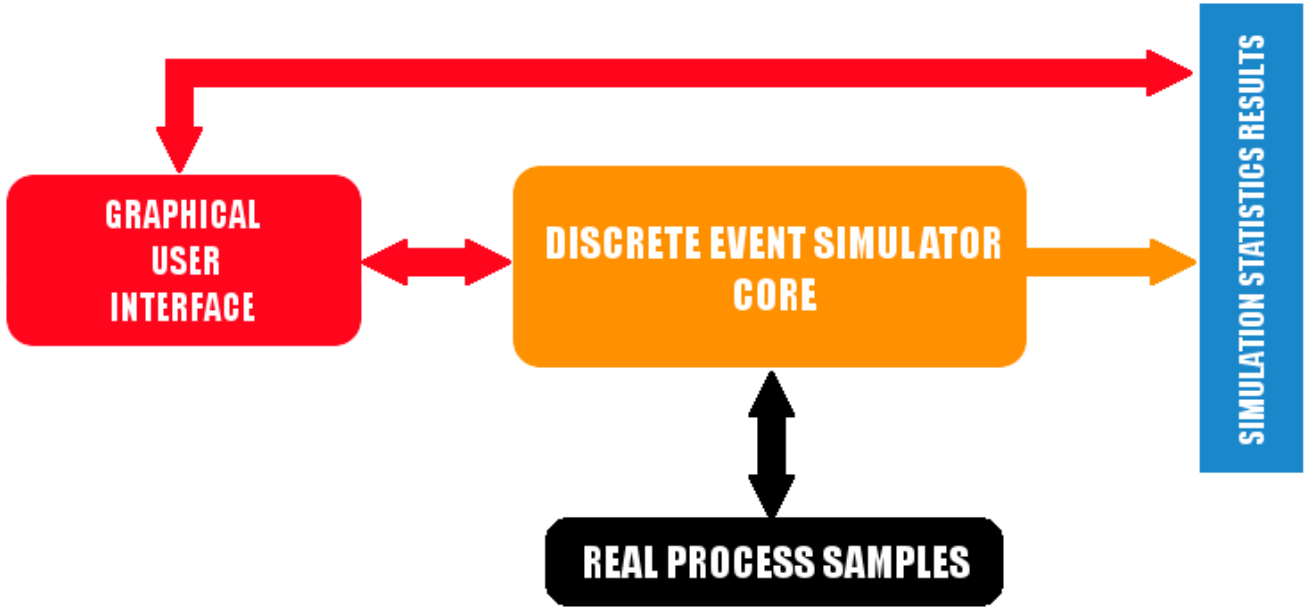
Gradiant Capacities for the Infrastructure Data Analytics Platform

Smart Port

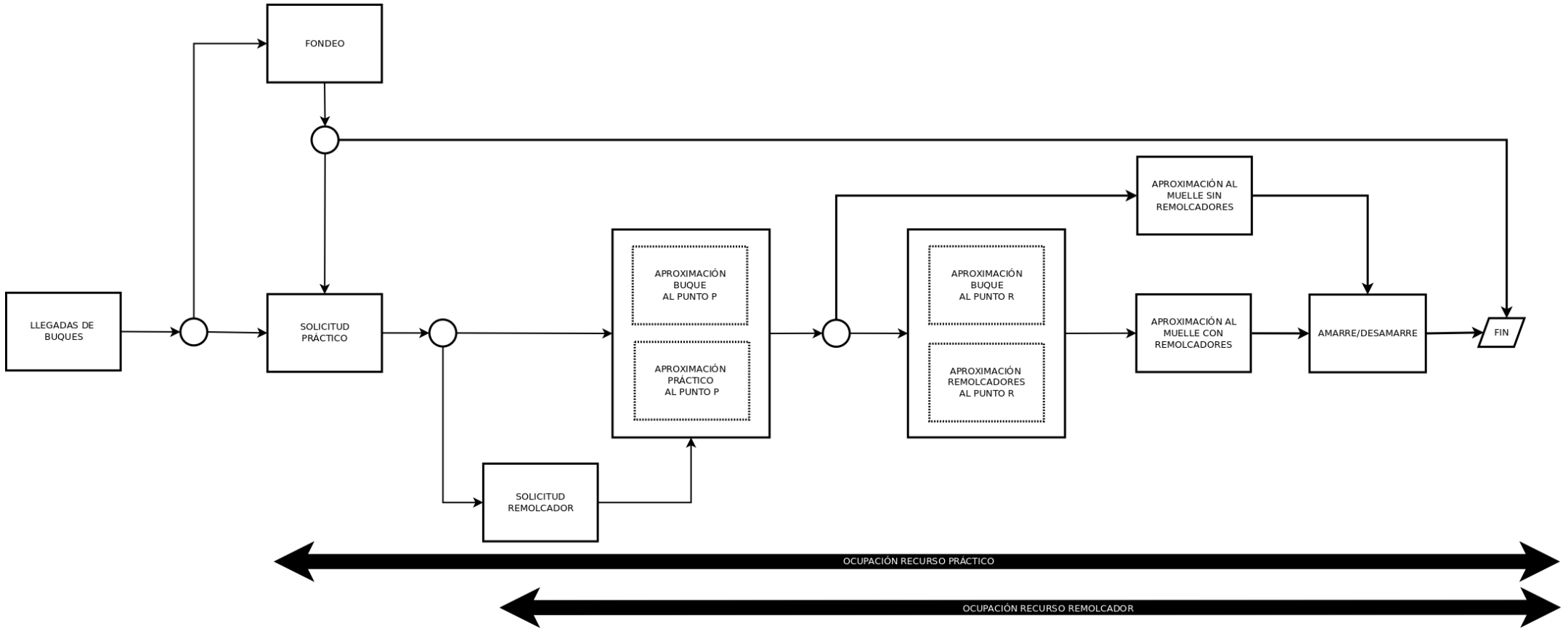
Platform components (I)

- Discrete event simulator engine

  Emulates port processes (ship layoff, mooring, load/unload, access control, etc.) in order to discover bottlenecks or model the usage of resources (pilots, tugboats, cranes, etc.).



Discrete Event Simulator architecture

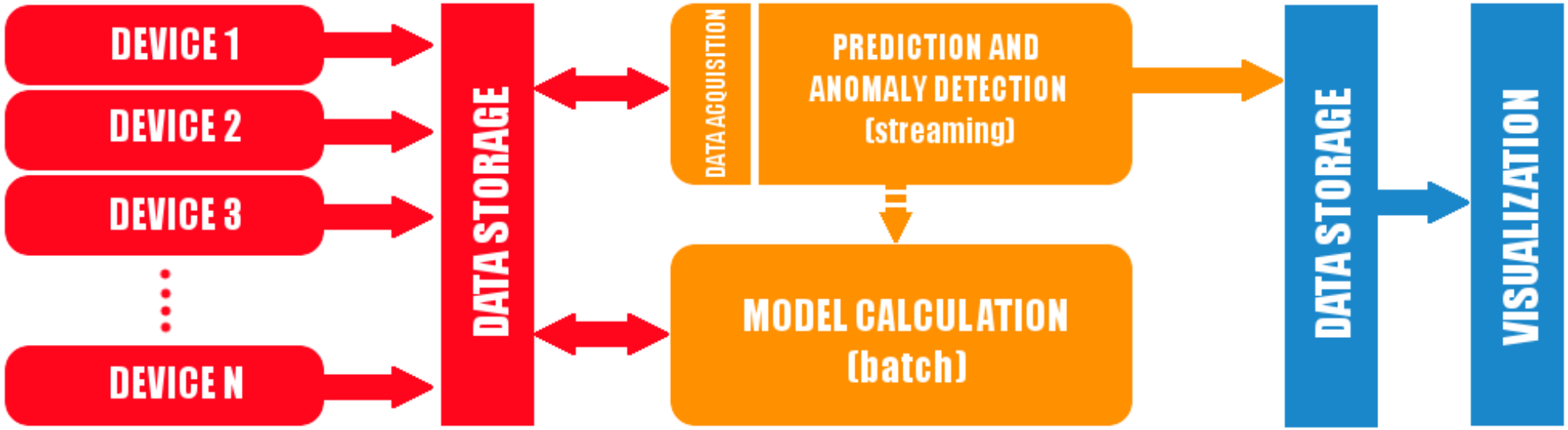


Example: mooring

Platform components (II)

- Big data analytic system

Analysis of the data measured in real time by sensors and devices, allowing the early detection of problems or the malfunction in the port infrastructure.



Big Data system for statistical analysis

Platform components (III)

- The Big Data platform uses the following technologies

Thanks for your attention

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