smartPORT Hamburg
IoT-Architekturen und Visualisierungen – alles neu?
Agenda

01 Introduction Hamburg Port Authority

02 smartPORT Traffic and Infrastructure Management

03 smartPORT Projects

04 IT-Architecture during project phase

05 IT-Architecture after project phase
01 Introduction Hamburg Port Authority

- Web Story Map in the Esri Cloud:

- 1,800 employees
- 7,200 hectare
- 9.7 Mio TEU in 2014
- 140 km streets
- 130 bridges
- 304 km railways
- 320 births
smartPORT logistics
Traffic and Infrastructure Management
Same area: More goods
02 smartPORT Hamburg Traffic Management
02 Traffic Management: Current Status

- 4 isolated control centers for
  - River
  - Railways
  - Roads
  - movable infrastructure

- About 300 traffic sensors

- 270 km of fiber optics

- First Hot Spots (WiFi)
02 Traffic Management: Vision Port Traffic Center
02 smartPORT Infrastructure Management

• Intelligent infrastructures
  - infrastructures detect their state via sensors
  - Maintenance orders are generated in the backend system automatically

• This technology is very far developed in wind engines
  - Wind engines detect in advance when they will have an error in future
  - Rotor blades have sensors which track and measure the frequency of vibrations
Integration: Traffic and Infrastructure Management
smartPORT logistics
some of the projects
03 smartPORT logistics Current Projects

Smart Road
Smart Tag
Smart Switch
Smart Parking
Smart Maintenance

SPL 1.0
Generating accurate Traffic Situation
Port Monitor
Port Traffic Center – Vision und Reality
03 Smart Tag

- Deployment of multi-functional sensors to construction site signs
- Visibility of all active construction sites incl. the active period time
- Real-time overview and information about short-term and ad-hoc construction site signs
- Traffic flow detection
- Visualization on Port Monitor
Smart Tag
03 Smart Switch

- Deployment of sensors in the high-frequent-switch of rail tracks for the condition analysis
  - Recognition of the trend for maintenances
  - Early warning for possible incidents and other events
  - Possible information to the object responsibles or the operators via HPA IT-Systems (SAP PM)
**Smart Switch**

- **Messkurve**
- **Kraftmessbolzen**
- **Strommessungen**
- **Schienentemperatur**
- **Systemeinheit**
03 Smart Maintenance

- Effective design for maintenance processes
- Immediate entries of information about maintenance work for each infrastructure object done directly on site
- Mobile solution
03 Smart Road

- Precise detection of traffic situation
- Air pollution measurement
- Intelligent control of street lights (adaptive lighting)
- Sensoring states of an bridge (concrete strain, vibration, grade of pillar)
Smart Road

Access Point bei Diva Tafel Hohe Schaar

Montage der neuen Leuchten

Access Point an Masten

Straßenbeleuchtung mit allen Komponenten
03 Port Monitor

- Control Center Software for the Vessel Traffic Center
- Electronic Chart with information about
  - Vessel positions
  - Water-level data
  - Berth positions
  - Width and Height of Bridges
03 Port Monitor
03 Mobile Port Monitor
04 Smart Parking

- Depending on geofences and position of trucks free parking space is allocated for truck drivers
- Depending on traffic situation, target and forecasts the parking space for each truck is calculated
- Trucks park "bumper to bumper"
- More trucks on same space
03 Smart Parking
03 Market Introduction SPL 1.0

- Mobile App for Smartphones and Tablets
- Web-Application of desktops

- Information from truck driver and dispatcher for
  - Real-time Traffic Situation
  - Closing time period of movable bridges in ports
  - Parking area around and within the port

- Service Market Place for the port community
Markteinführung SPL 1.0
Live Demo SPL Web (SAP Connected Logistics)
03 Effective Traffic Situation Analysis

- Application for
  - Visualization of an integrated traffic situation from all sources
  - Illustration of a Routable Road Network,
  - Creating short-term forecast of traffic situation

- Visualization of the traffic information on DIVA-Signage
EVE - Effektive Verkehrslage Ermittlung

Anzeige aktuelle Geschwindigkeiten im Hafenstraßennetz

Manuelle Eingabe zusätzlicher Verkehrsinformationen - VInfo-Eingabe
03 Port Traffic Center – Vision and Reality

- A Pilot Demonstration to follow the idea „Control Center of the Future“ – The Port Traffic Center
- All projects of smartPORT-Initiatives in one place as live demonstration in a Showroom with different scenarios
smartPORT logistics
IT-Architecture during project phase
04 Basic conditions

- Fix deadline for all projects: world ports conference in June 2015 in Hamburg
- High speed and dynamics in all projects
- Keep overview ("speed more important than strategy")
- Weekly meetings of project managers
- Much communication about state of the projects with many stakeholders: project managers / Business / IT companies / Members of the board
- Put the architecture in existing EAM tool
Sensors in the Port of Hamburg
05

smartPORT logistics
IT-Architecture after project phase
05 Challenges as result of the projects

- New objects: sensor systems
- Connection to physical objects is “suddenly” important
- That means:
  - Traditional graphics are not good enough any more because the complexity has risen
  - New forms of visualization are needed
    - Visualisation via stories
    - Visualisation via augmented reality
- New meta model necessary to answer questions like:
  - Which IT system uses which sensors?
  - Are there other use cases for new technologies / may be in new combination?
  - For which physical objects can new technologies also be used?
  - …
New objects in IT-Architecture: SmartBricks
New Meta Model extension
New visualization of IT data and physical data with augmented reality
New visualization of IT data and physical data with augmented reality
New visualization of IT data and physical data with augmented reality
New visualization of IT data and physical data with augmented reality

Länge: 10.00263500213623, Breite: 53.54587173461914, Genau: 12.572256
New visualization of IT data and physical data with augmented reality
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New visualization of IT data and physical data with augmented reality
Our vision: one digital model of the port with IT-objects and physical objects for different presentation forms: AR, VR, Browser, mobile apps
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