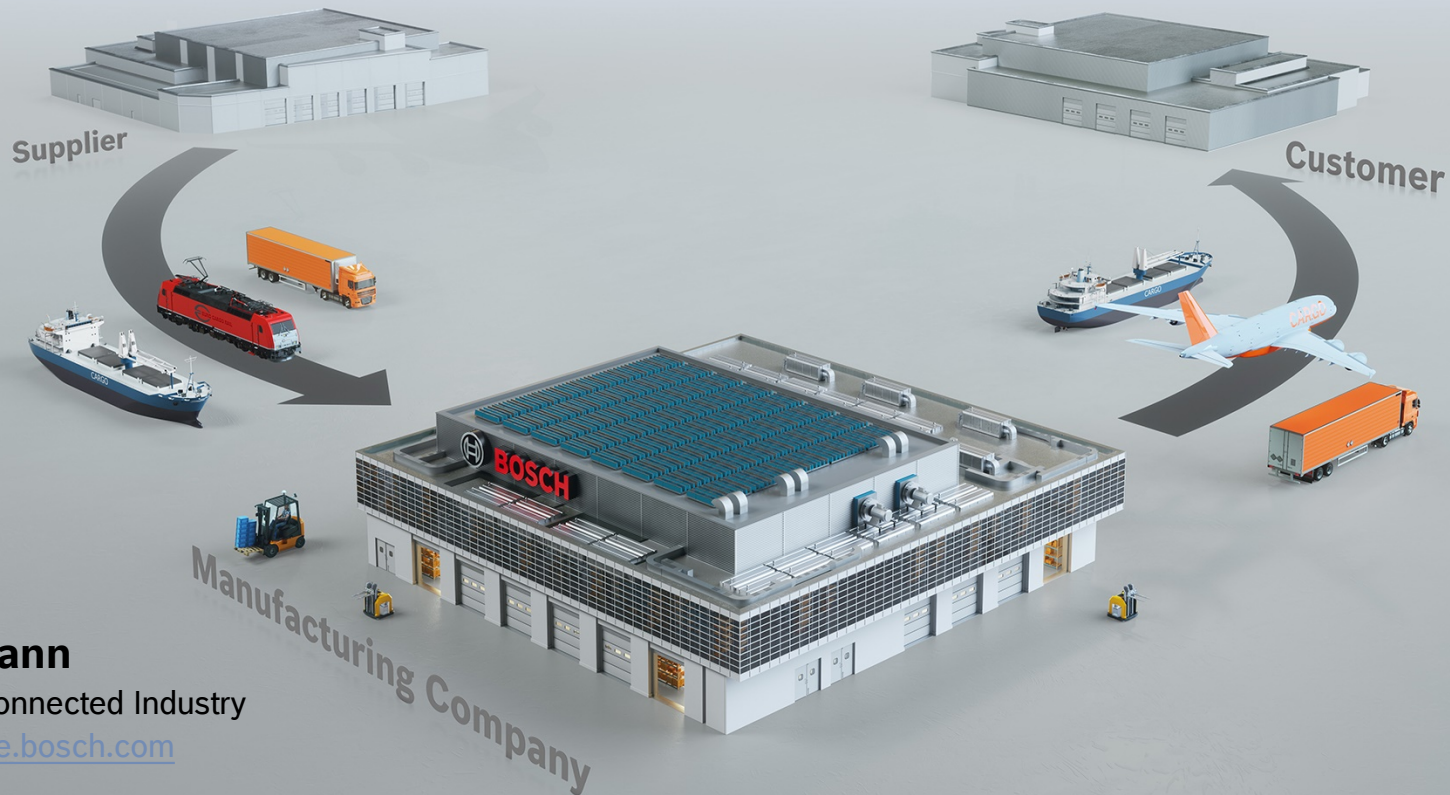


NEXEED CONNECTED LOGISTICS

Pragmatic real-time Logistics



Matthias Huelsmann

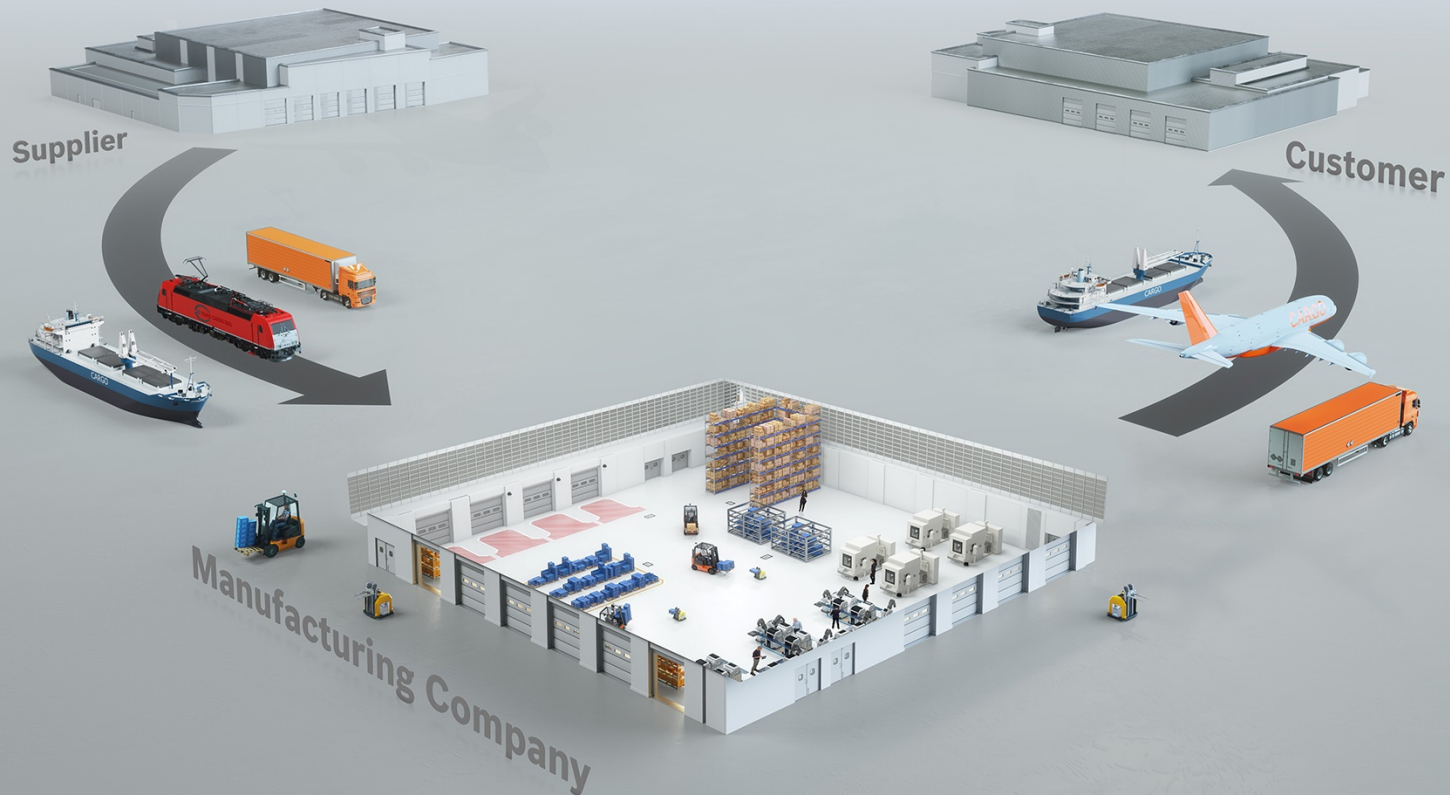
Vice President Bosch Connected Industry

matthias.huelsmann@de.bosch.com

+49(173) 8 93 66 97

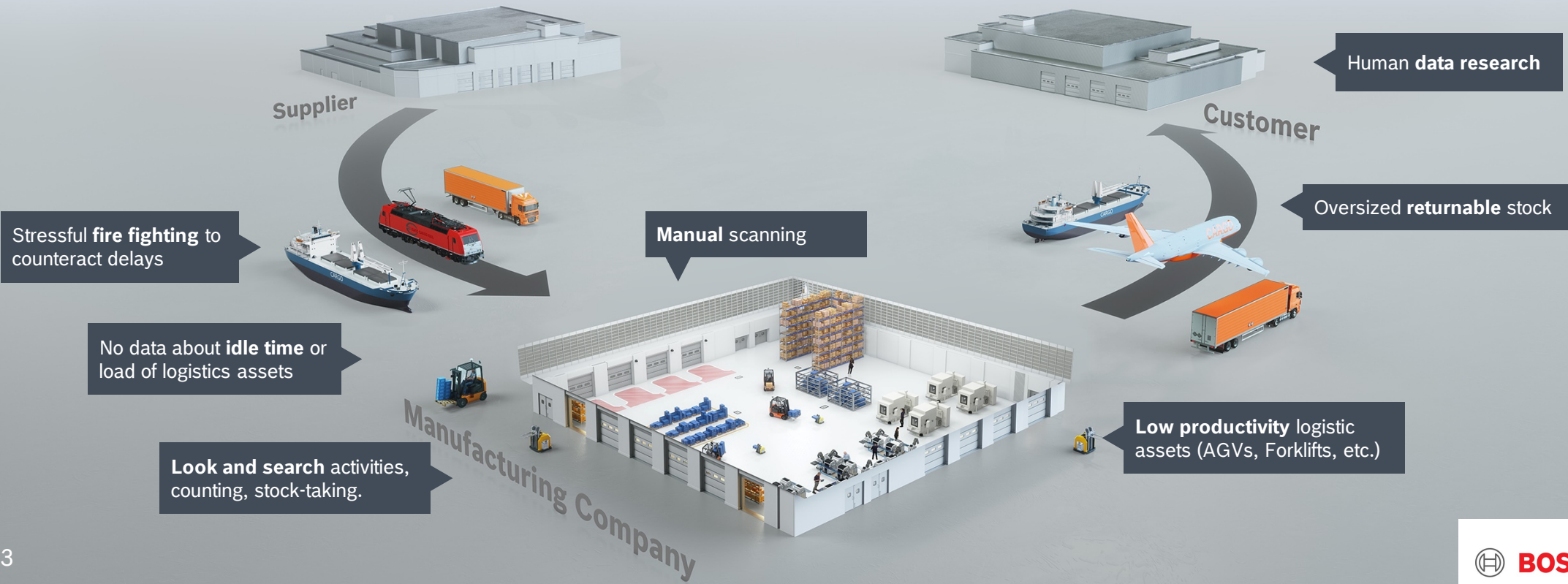
NEXEED CONNECTED LOGISTICS

Pragmatic real-time Logistics



Nexeed Connected Logistics

Actual Supply Chain



Nexeed Connected Logistics

Actual Supply Chain

Plenty of room for improvement due to a lack of transparency and missing data



Up to
15-30%

look and search, inventory and bar code scanning / booking processes



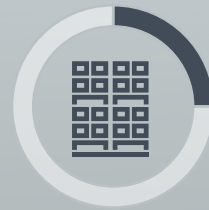
60-80%

of the time logistics assets, such as forklifts, are non-productive



Up to
50%

of milk runs on cyclic routes run empty



20-30%

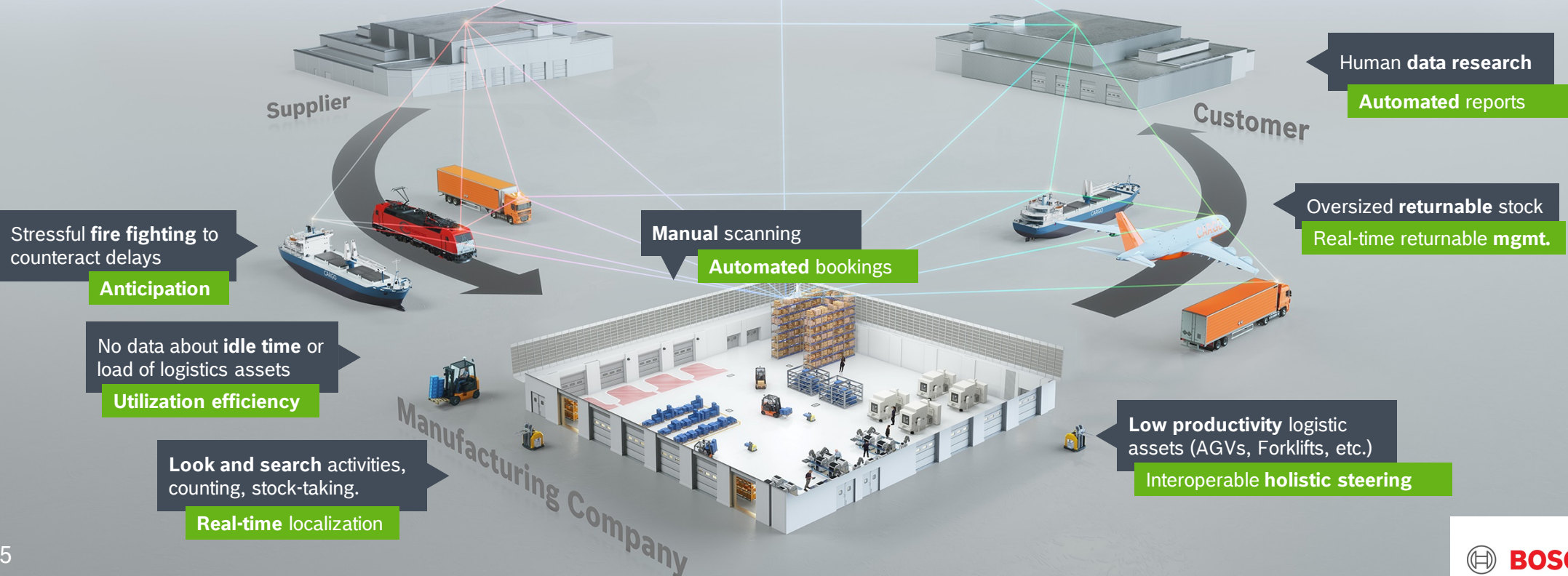
of the circulation load carrier is oversized (working capital)



20-30%

of logistics planners' time is spent gathering status information and coordinating material flow processes

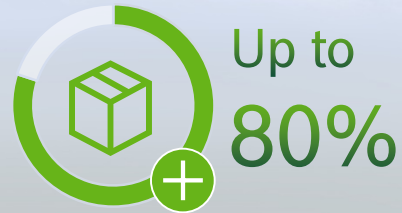
Nexeed Connected Logistics Digital Supply Chain



Nexeed Connected Logistics

Digital Supply Chain

Improvements with transparency due to real-time IoT data



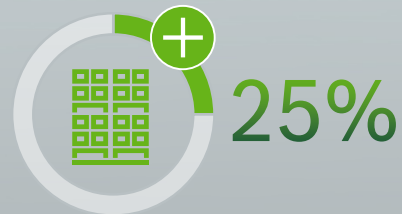
cut-back of search, inventory and bar code scanning/ booking efforts



uptime increase of logistic assets, such as forklifts



increase of space utilization for milk runs on dynamic routes



availability increase of circulation load carriers, i.e. no re-investment needed



time saved gathering status information and coordinating material flow processes

NEXEED TRACK AND TRACE



NEXEED INTRALOGISTICS EXECUTION



Asset Tracking

Transparency of Manufacturing Tools Logistics

Customer // Bosch Plant Waiblingen

Benefits

- ▶ Search times reduces thanks to transparent internal processes
- ▶ Less handling and coordination efforts with suppliers/partners due to external process transparency
- ▶ Fast reactivity in case of deviations
- ▶ ROI < 1.5 years



Asset and Material Tracking

Tracking of transport drums and material

Customer // Rehau

Benefits

- ▶ Low search efforts and cross-plant coordination
- ▶ Product information from the manufacturing process
- ▶ Optimized drum disposal based on condition (full/empty)



Location: Germany
Tracking focus: plant to external suppliers

Picture: Rehau

Material Tracking

Real-time tracking of time-critical shipments

Customer // Bosch plant Reutlingen

Benefits

- ▶ Overview of the current location of all time-critical shipments at a glance
- ▶ Contribution to ensuring timely deliveries
- ▶ Avoid expensive special deliveries to customers
- ▶ Prevent costly searches; increase responsiveness
- ▶ ROI < 1 year



Nexeed Track and Trace

Plug & Play implementation in the supply chain

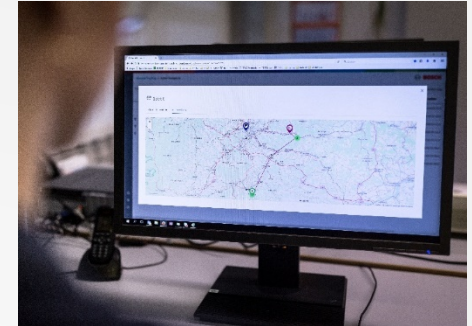
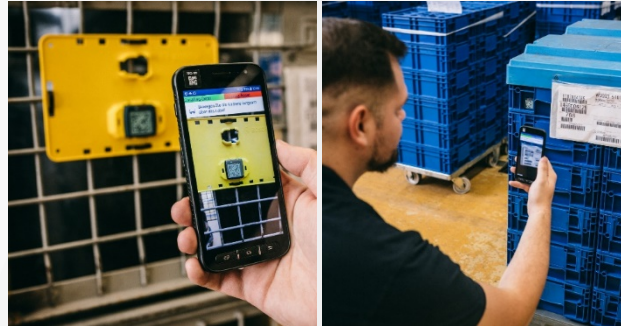
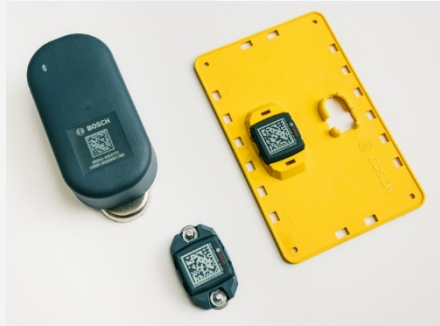
Sensors (permanently) attached to assets

Gateways installed at critical milestones in trailers

Sensors linked to assets or transported goods, which are digitally mapped in the system

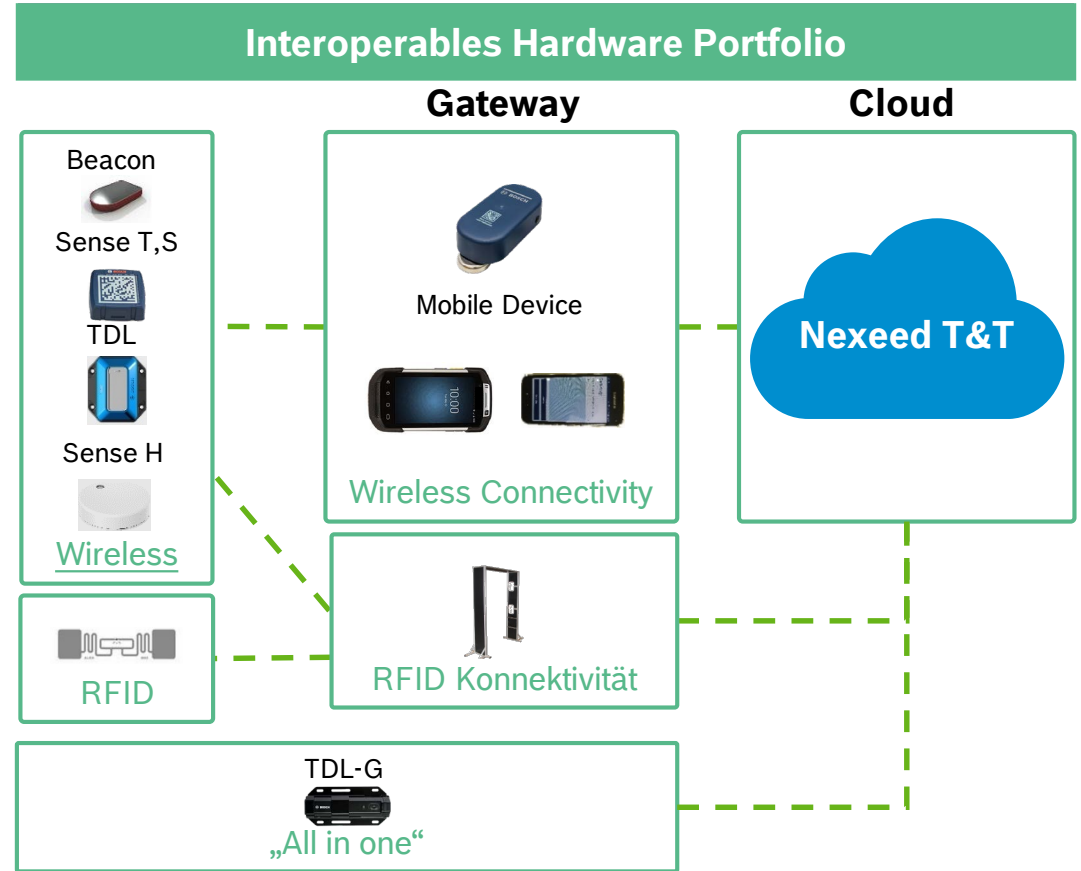
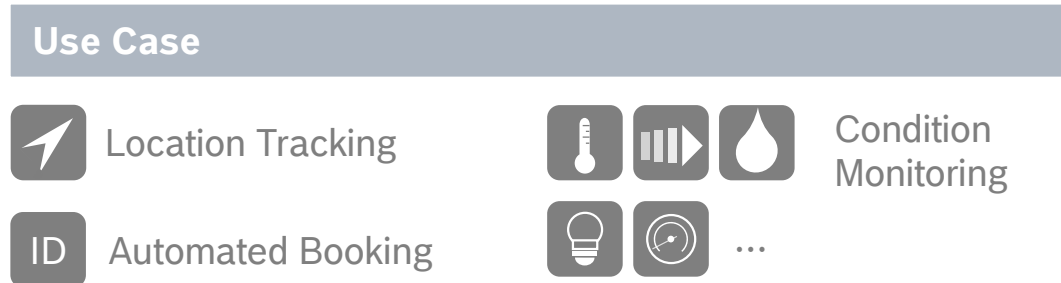
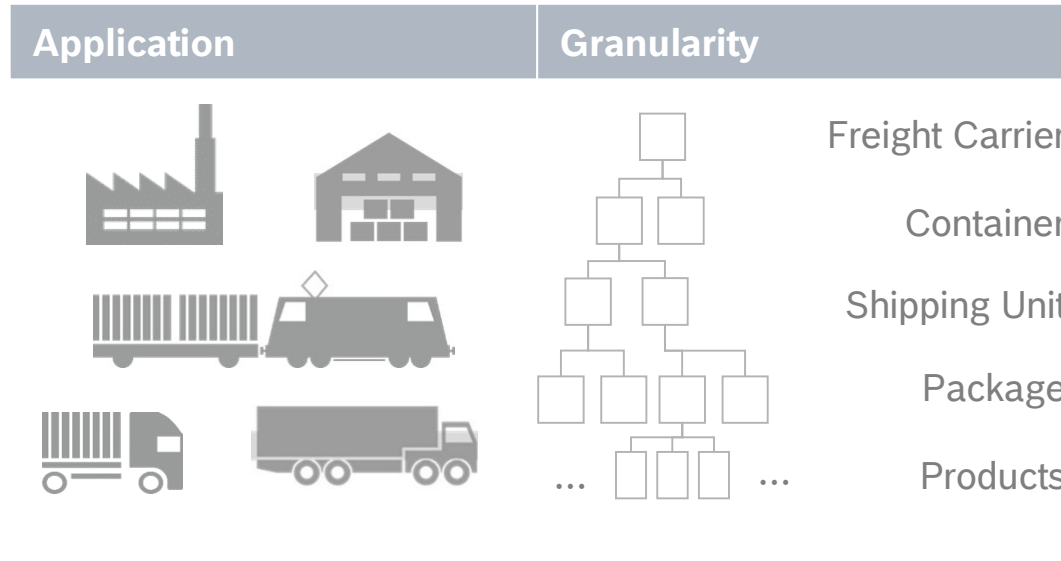
Automatic data transmission in real time from sensor via gateway to the cloud

Real-time data for operations and analytics: location, condition and logistical context information
Basis for further services



Nexeed Track and Trace

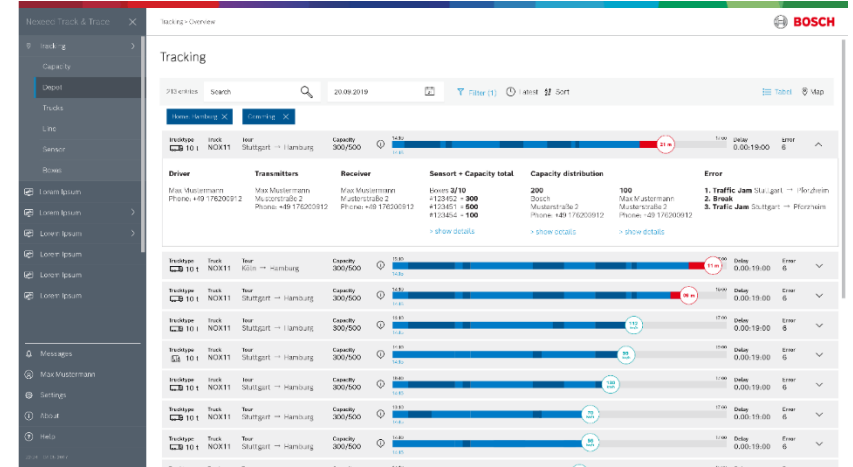
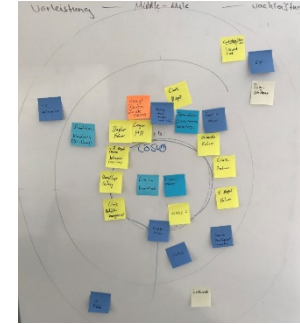
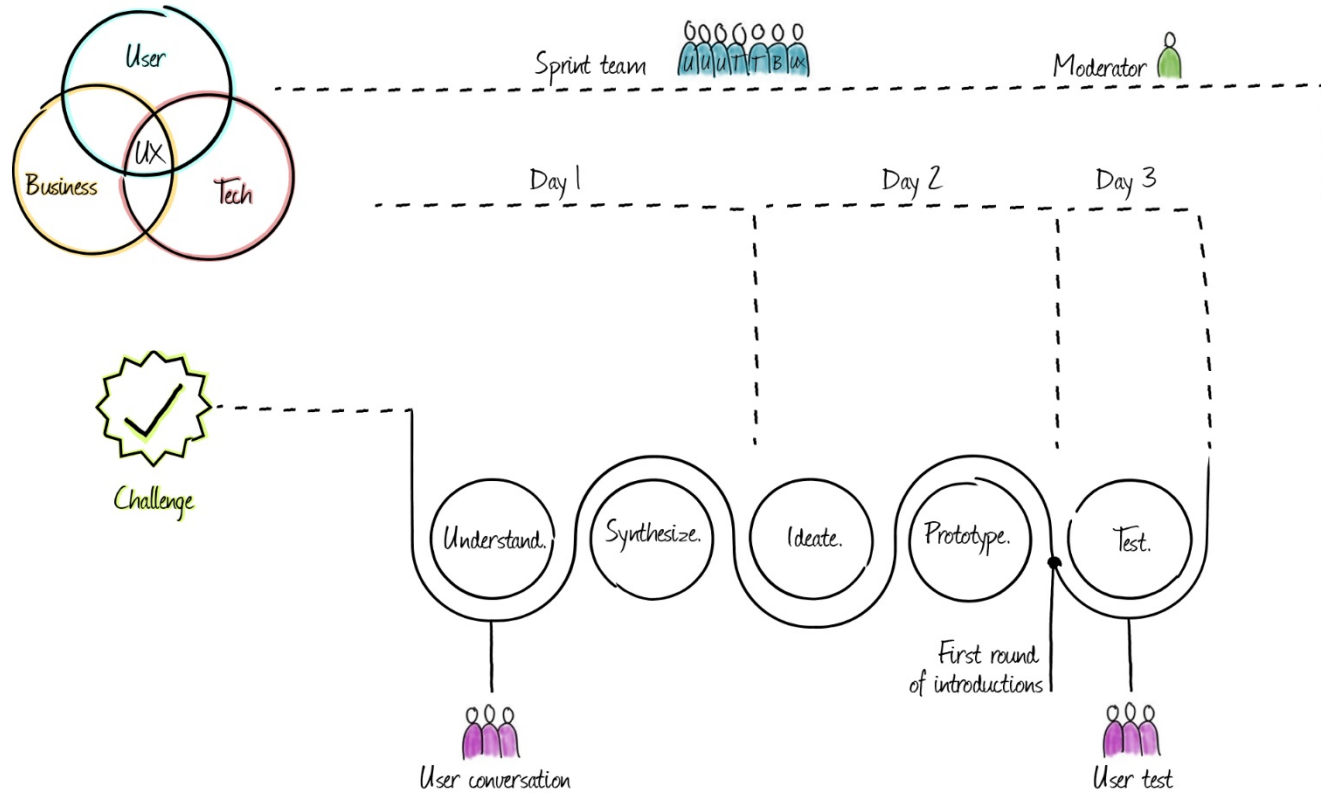
How to get logistics IoT data?



T: Temperatur S: Schock H: Feuchtigkeit TDL: Transport Data Logger

Nexeed Track and Trace

What ideas/ prototypes solve the problem?



Nexeed Track and Trace Success Stories



Automobile OEMs

Reduction load carrier loss,
optimized utilization:

Time and cost reduction, easy real-time KPI measurement



TRUMPF

Transparency on special container
in machinery industry:

Reduction search efforts, re-invests
and plant-plant coordination



nox NachtExpress

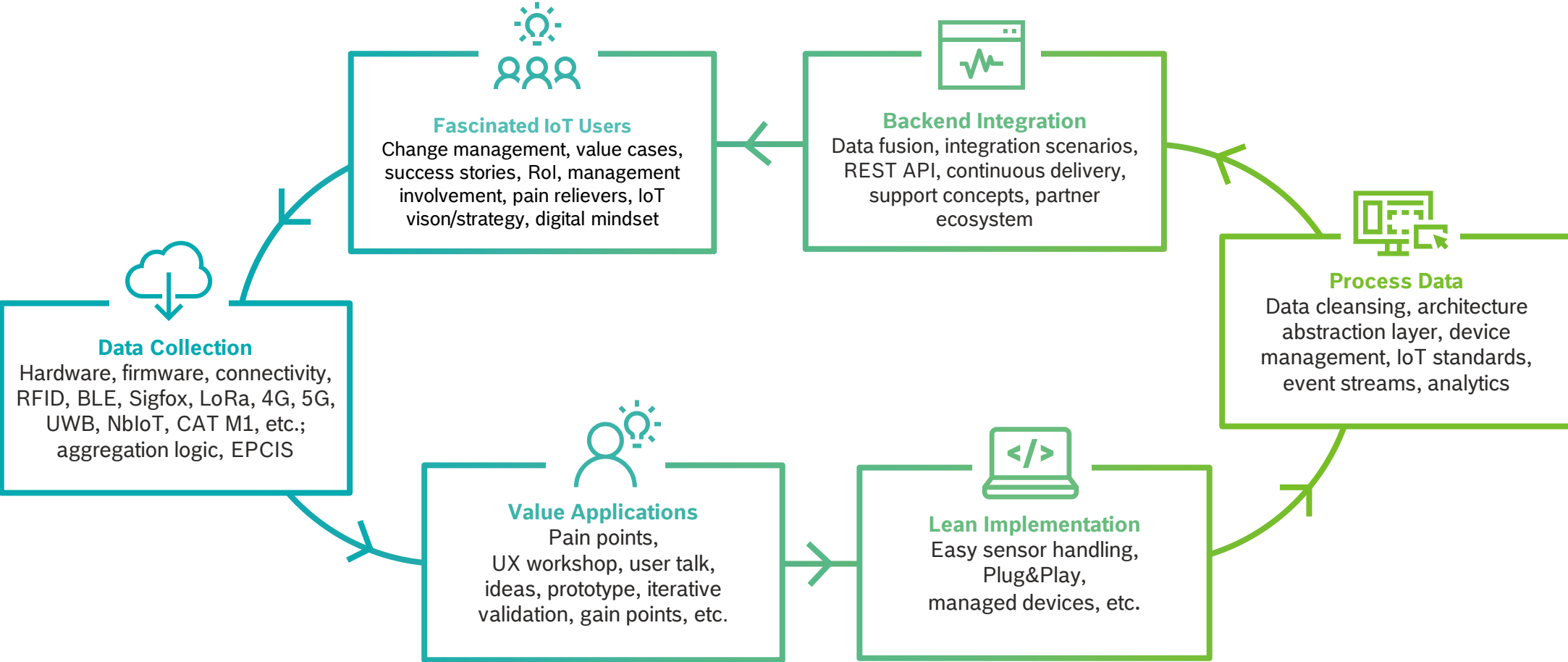
Electronic proof of container:

Reduction manual search, book and
inventory efforts.

> 26 external customers | > 80 projects delivered | ROI < 2 years

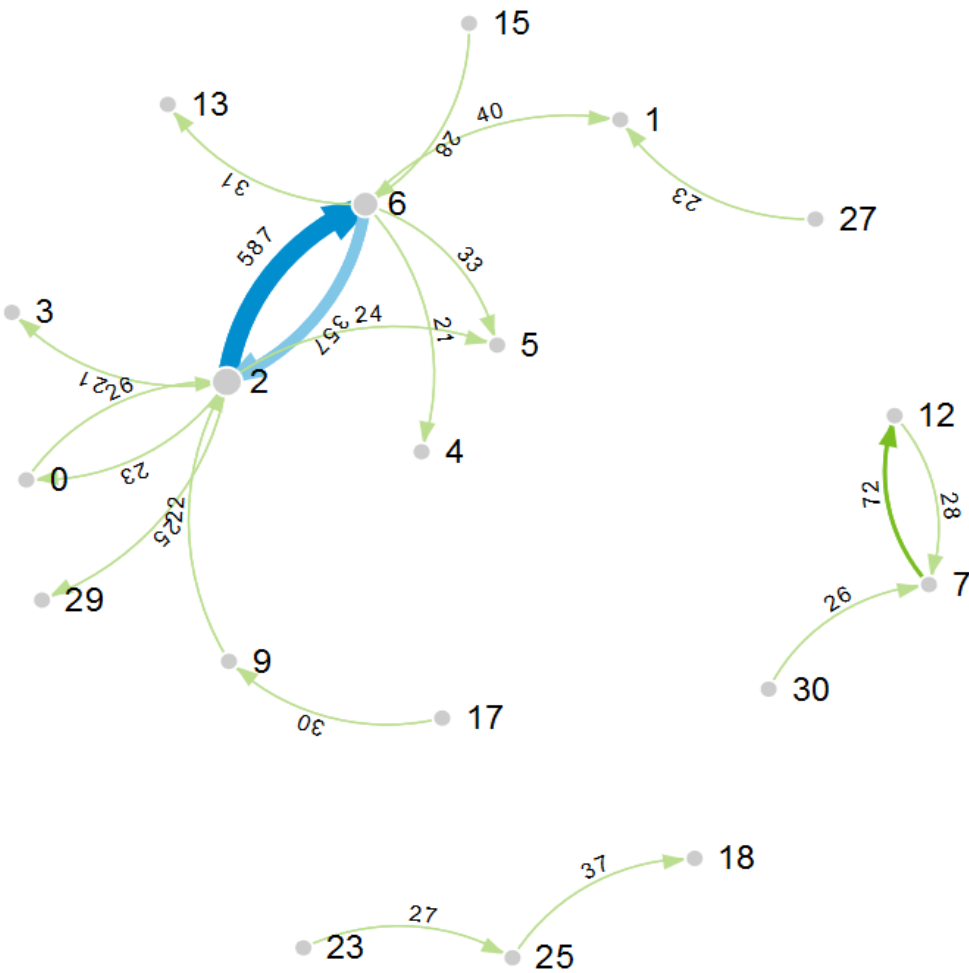
Nexeed Track and Trace

Virtuous cycle of IoT



Nexeed Track and Trace

How to reduce losses?



Supply Chain Manager



How to identify the cause of losses?



Actual material flow:
net flow from site 2 to site 6;
reduce e.g. at sites 13, 29, 18 etc.

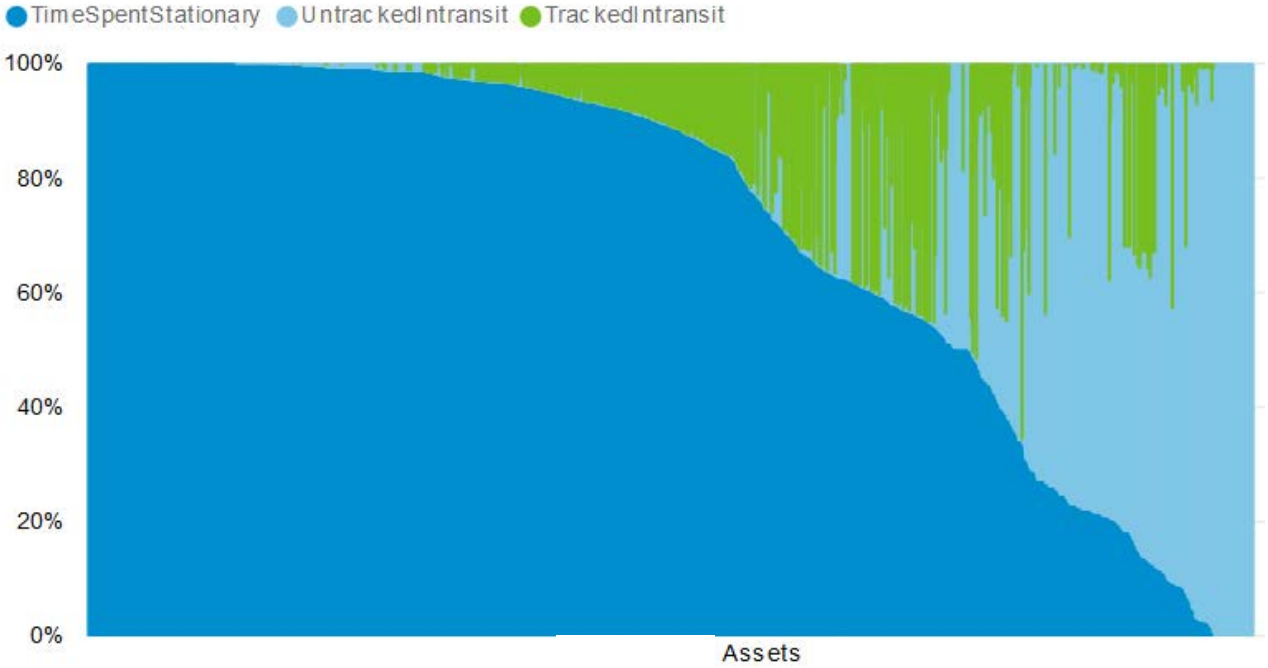


Sites clarify why logistics assets leave the cycle



Nexeed Track and Trace

How to improve asset availability?



Asset Manager



How to raise productivity of logistics assets?



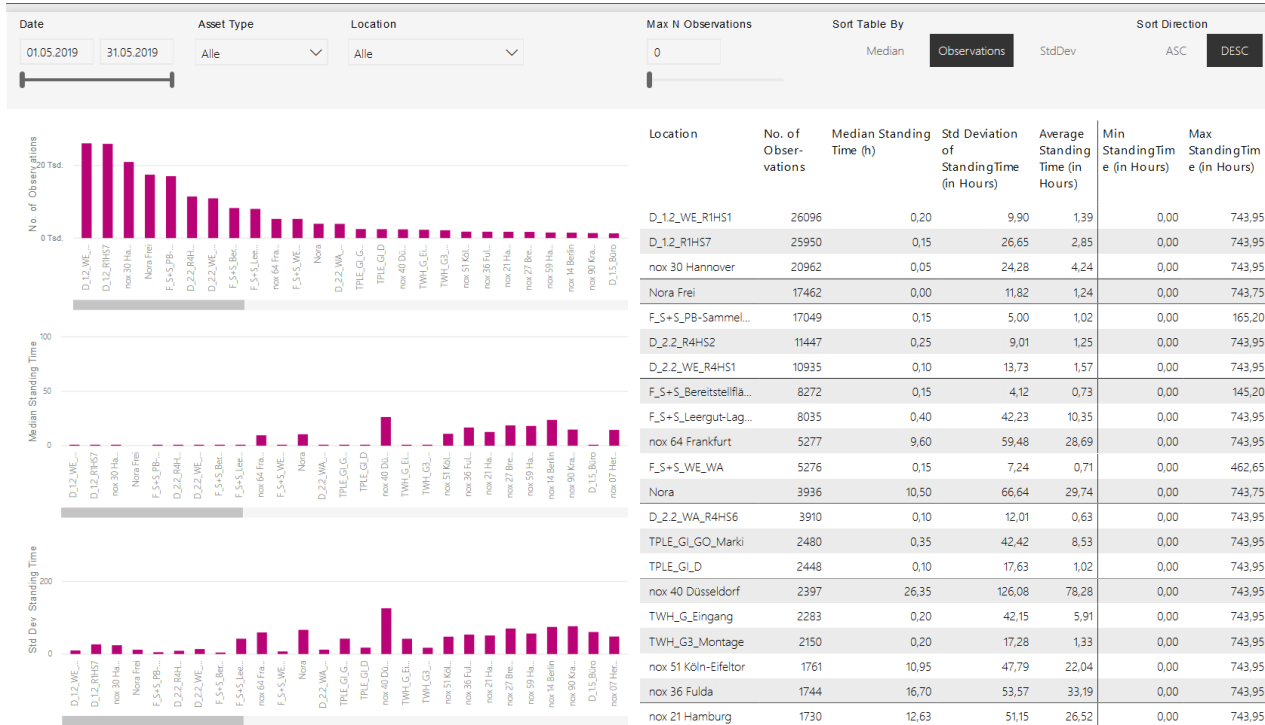
~ 20% of containers not utilized
> 50% not moving in 80% of time
Containers misused for storage



Detailed information on throughput times and quantities of logistics assets per site

Nexeed Track and Trace

How to improve site performance?



Manager Operations
Logistics Service Provider



How to raise productivity of logistics assets and improve performance of sites?



High number of assets, downtime and average throughput times



Meeting with site managers to discuss measures for increased productivity

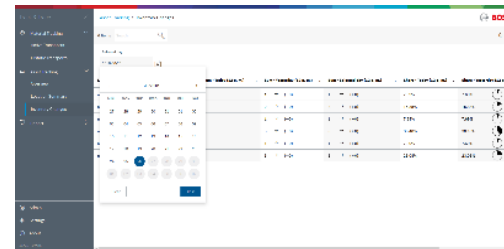
Nexeed Track and Trace Solution at a glance

Data Service for Process Enhancements

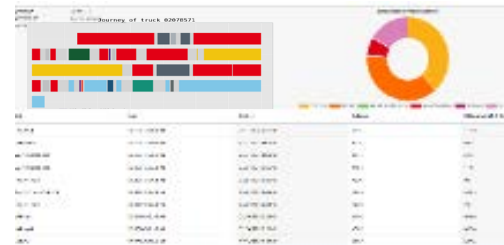
- ▶ **Eliminating of booking efforts** based on real-time tracking events
- ▶ Real-time assets overview **reducing search and inventory effort**
- ▶ **Reacting rapidly on incidents and deviations** from the schedule based on alerts and condition monitoring
- ▶ **Increasing productivity** of the asset fleet
- ▶ **Analyzing the loss** over the entire supply chain
- ▶ **Optimizing planning and scheduling** based on assets history and material flows
- ▶ **Implementing of new billing models**, e.g., for the rental of load carriers



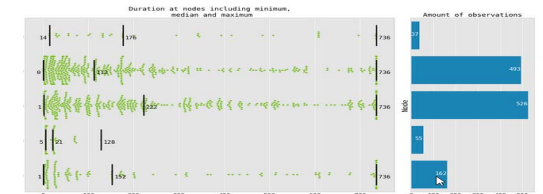
Real-Time Milestone Tracking



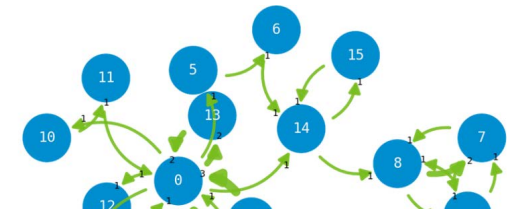
Automatic Reports



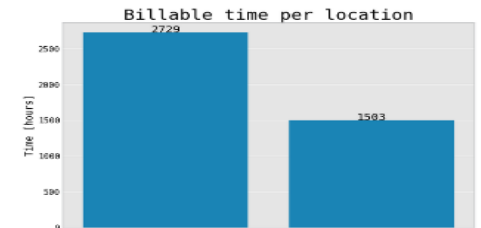
Asset and Shipment Analysis



Throughput Time Analysis



Network Analysis



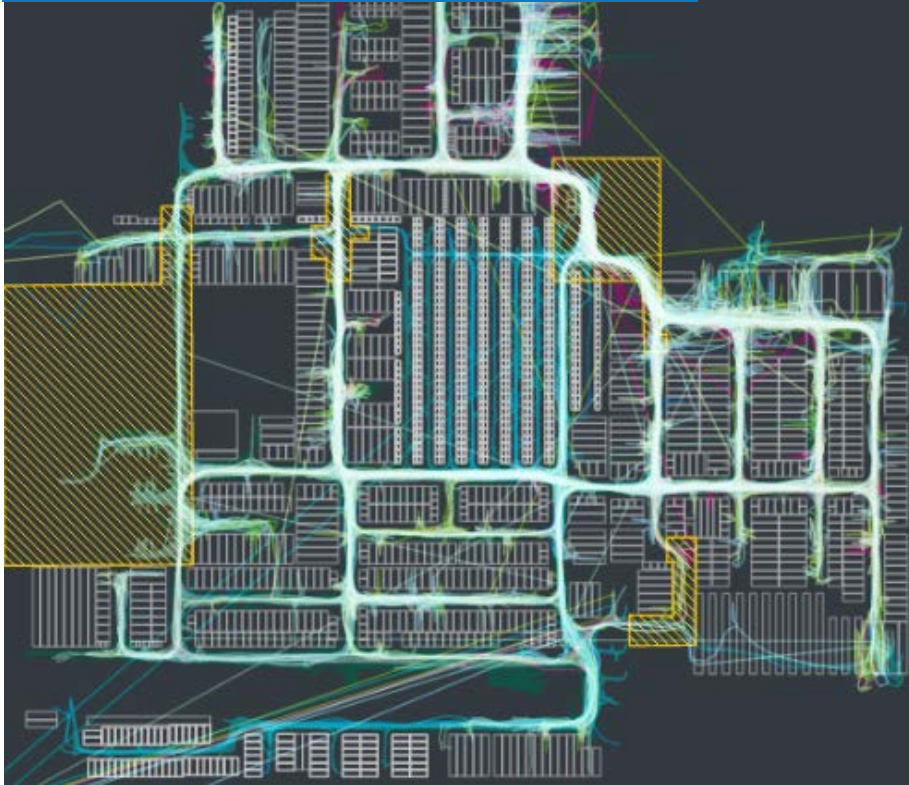
Billing of Assets



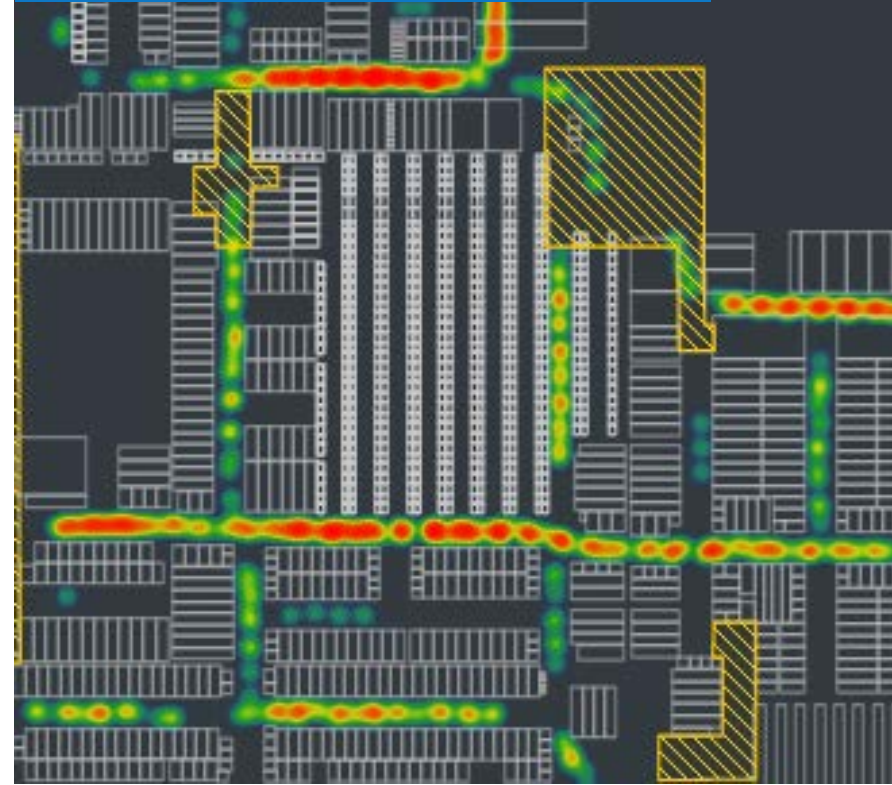
Nexeed AGV Fleet Analytics

Visualization Routes & Heatmap

Driveway Visualization (Focus: Routing)

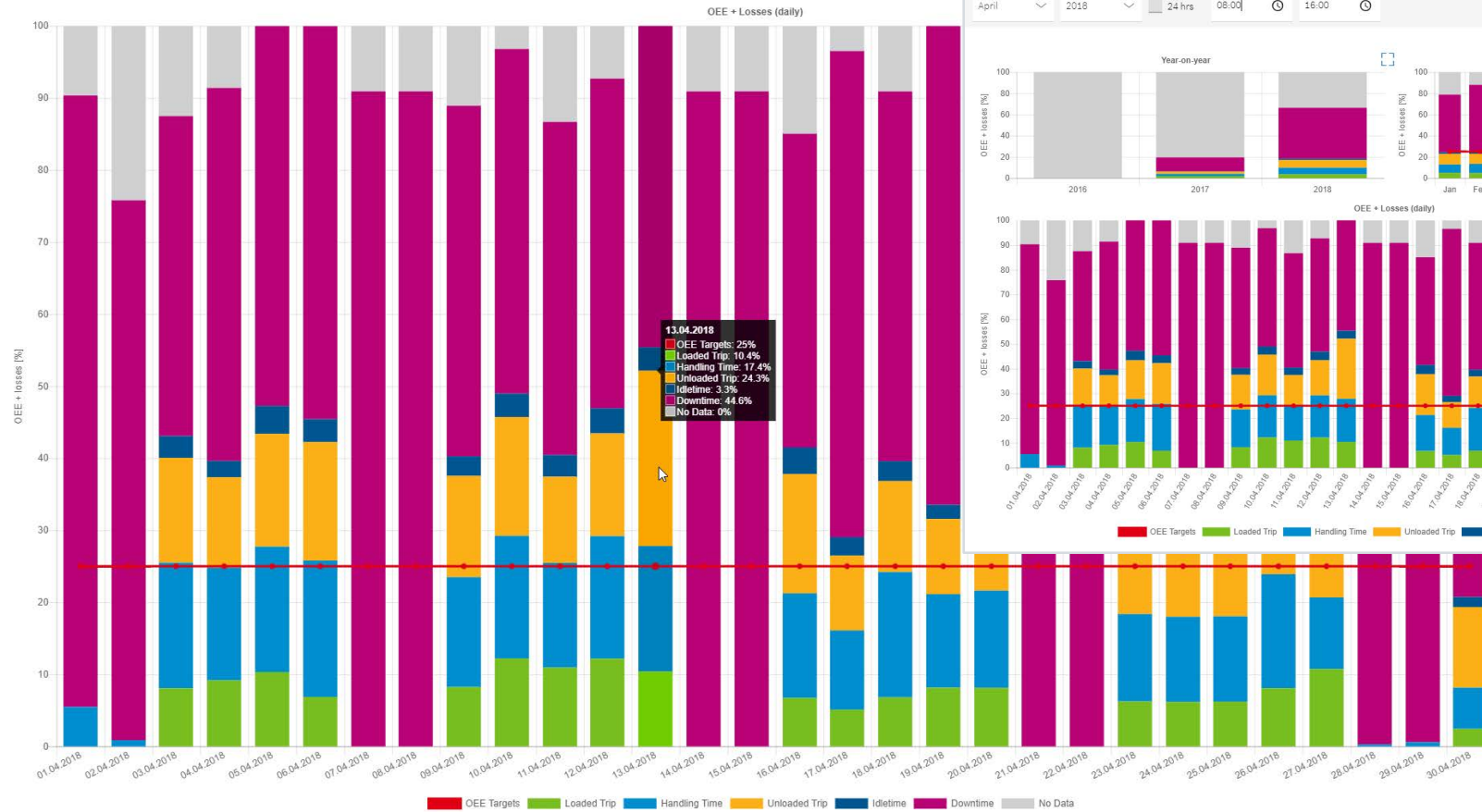


Driveway-Visualization (Focus: Velocity)



Nexeed AGV Fleet Analytics

OEE-Report



BOSCH

OEE Report

April 2018 24 hrs 08:00 16:00

Year-on-year

OEE + Losses (monthly)

OEE + Losses (daily)

Vehicles

- Klammerstapler
- Stapler 308
- Stapler 310
- Stapler 312
- Stapler 313
- Stapler 318
- Stapler 332
- Stapler 334
- Stapler 336
- Stapler 337
- Stapler 338
- Stapler 340
- Stapler 341
- Stapler 343

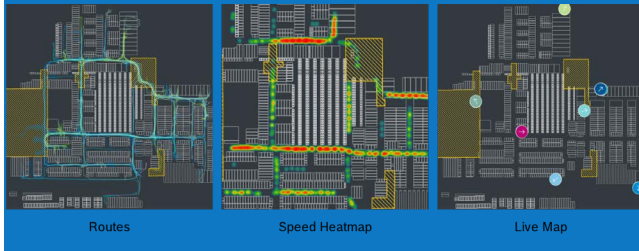
■ OEE Targets
 ■ Loaded Trip
 ■ Handling Time
 ■ Unloaded Trip
 ■ Idletime
 ■ Downtime
 ■ No Data

Fleet Analytics

Complete Transparency of the Vehicle Fleet for Logisticians

Benefits

Increased productivity of individual transport vehicles as well as the entire fleet by **8%** thanks to transparency in the intralogistics processes



Location: Europe
Mode of transport: Intralogistics

Stock Management Overview FeP Use Case

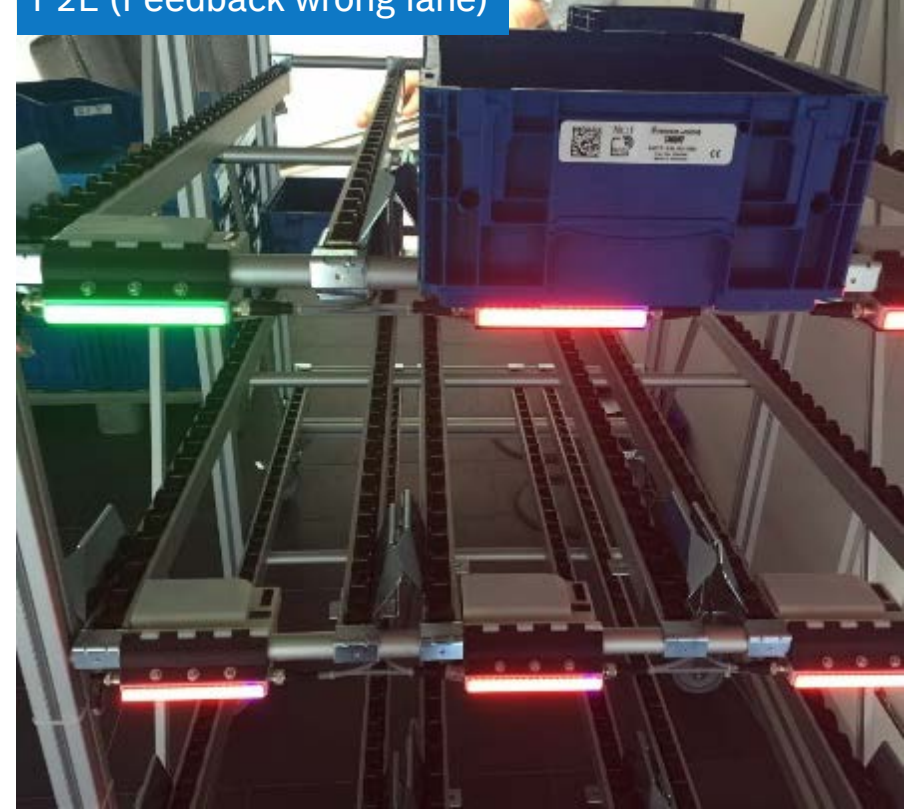
RFID reading with Wristband



P2L (Correct lane)



P2L (Feedback wrong lane)



Stock Management Control Center

The screenshot displays the IES Control Center interface for stock management. The main view shows a 3D visualization of a warehouse layout with various storage bins and their current stock levels. The interface includes a navigation sidebar on the left, a top header with 'Bestandsverwaltung' and 'Frankreich', and a right sidebar with configuration details for 'Supermarkt'. A table at the bottom provides a summary of the current inventory.

Material	Stock
> 1480.C40.000	5
> 1480.C10.002	2
> F00N.201.306	1
> 1461.C06.999	1
> 1460.C97.007	4

Stock Management

Digitizing material flow and materials localization in real time

Customer // Bosch Feuerbach plant

Benefits

- ▶ Increasing transparency of stock and location
- ▶ Improving error prevention
- ▶ Reduction of booking efforts
- ▶ Cost savings € 120.000
- ▶ ROI < 1.5 years



Location: Europe
Mode of transport: Intralogistics

Challenge

- ▶ Employees need long carry out time-consuming manual bookings
- ▶ Less transparency in the warehouse due to manual operations

Approach

- ▶ Digitization of the internal material flow
- ▶ Automatic material bookings and follow-up orders supports employees in their daily work
- ▶ Using the available lanes and containers efficiently allows the supermarket to be kept relatively small

Stock Management

Worker Support via Put-to-Light LEDs



Inventory Mode



Feedback regarding the Putaway process



Shows blocked lanes; e.g. according quality topics



P2L shows the right lane and gives feedback to the workers

Pragmatic Real-time logistics

A New Paradigm



Pragmatic real-time logistics

The Pragmatic Approach



Focus on Value-add in User story



Lean and robust integration in material flow



Plug and play solution with standard interfaces into information flow



Adequate IoT technology for reliable, low-cost, real-time IoT data



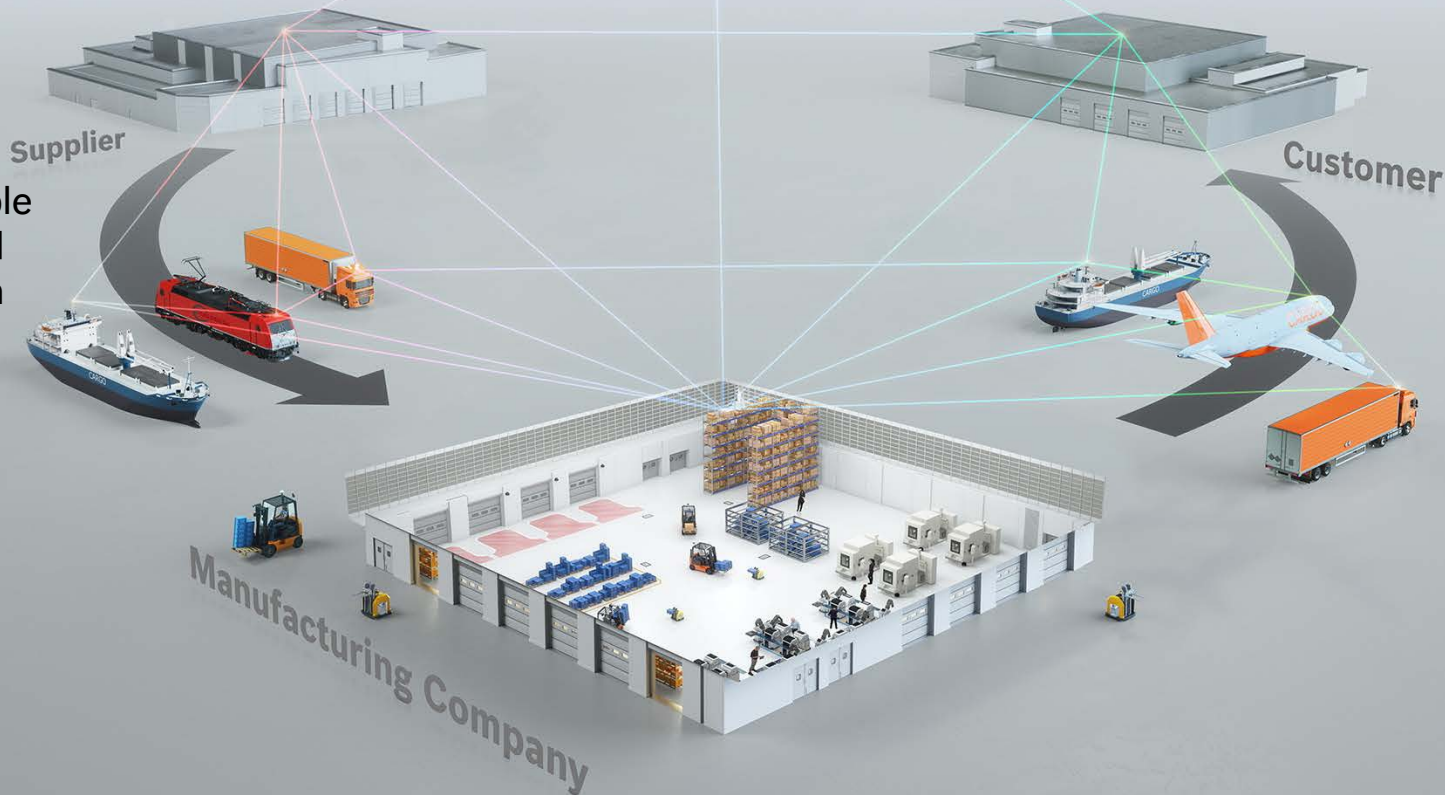
Managed IoT services to make life EASY for logistics people

Pragmatic Real-time logistics

A New Paradigm



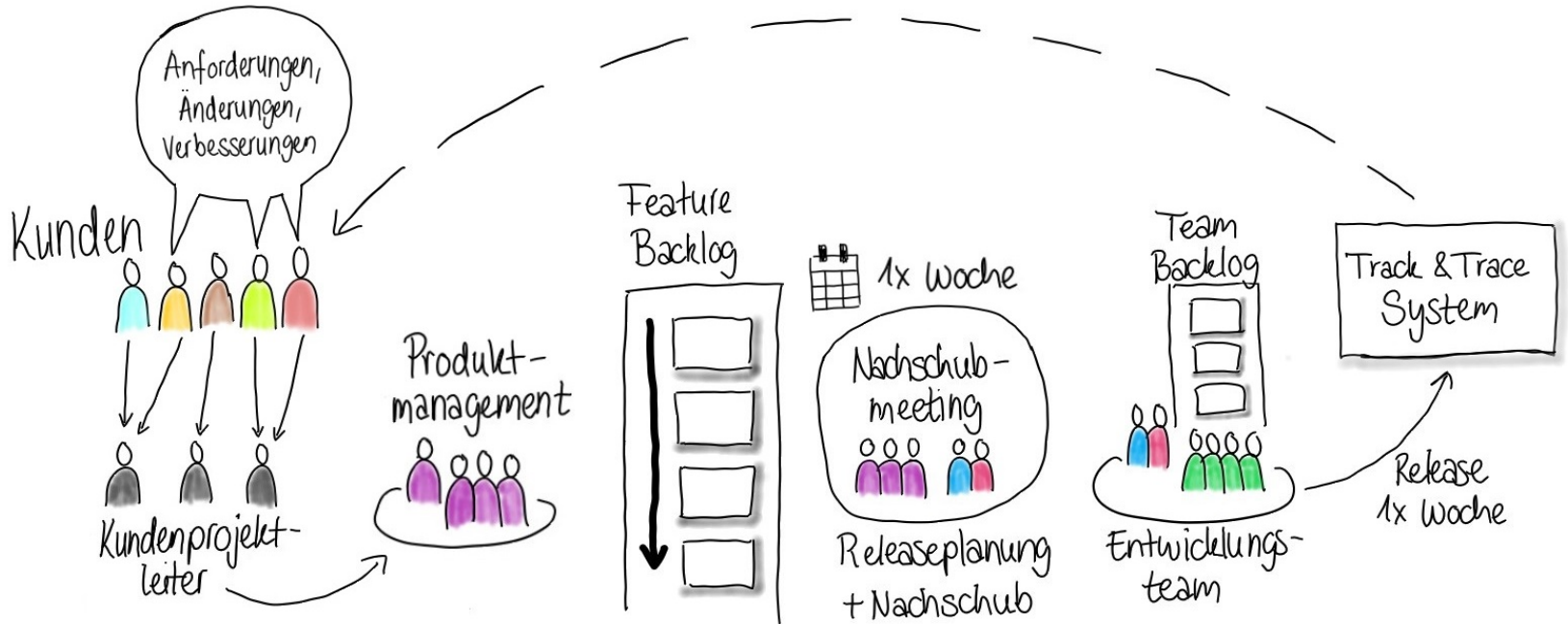
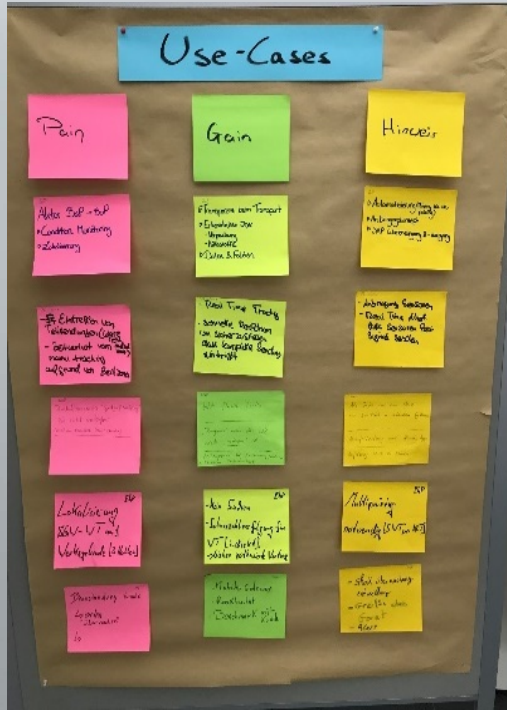
- ▶ Overcomes the shortfalls of document-flow logistics
- ▶ Change in perspective: making the material flow visible to logisticians and empowering them to actively steer it



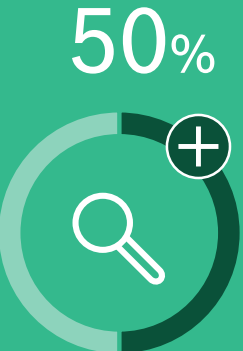
- ▶ Real-time services
- ▶ Visualization, anal. and dynamic routing
- ▶ Proactive deviation management
- ▶ Advanced data-process monitoring and steering
- ▶ Time of arrival estimated by AI
- ▶ Automated material flow monitoring and steering
- ▶ Deep learning for structural improvements

Pragmatic Real-time logistics

User Feedback



Pragmatic Real-time Logistics Green & Profitable



Reduction of losses



25%

Increased productivity



Up to 75%

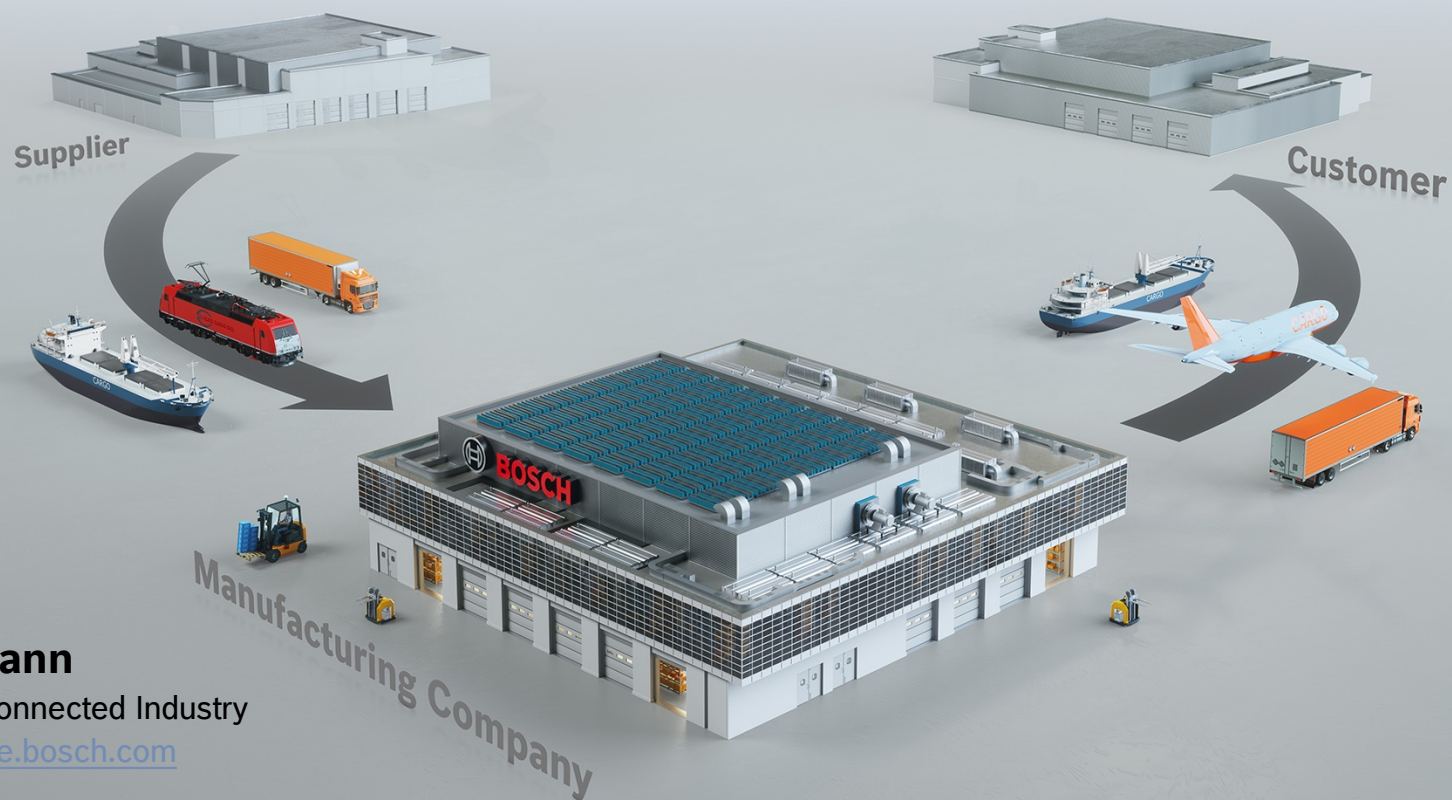
Cut-back of search and inventory efforts



Thank you!

Let's make digitalization profitable business

<https://blog.bosch-si.com/industry40/what-pragmatic-real-time-logistics-is-all-about/>
<https://blog.bosch-si.com/industry40/pragmatic-real-time-logistics-a-new-material-flow-paradigm/>
<https://www.bosch-connected-industry.com/connected-logistics/>



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Connect Your
Supply Chain!

