INTERNATIONAL UNION
OF RAILWAYS

# Welcome to the sixth UIC Digital Conference

December 11th, 2020

11:00-13:30 (CET time)

# Programme

Moderation by Simon Fletcher

## Introduction by UIC

**Introduction by François DAVENNE (UIC General Director)**
**Evgeny CHARKIN (RZD CIO and UIC Digital Platform Chairman)**

## Keynote Speakers

**Keynote by Jean-Michel MIS (Member of French Parliament and Member of National Digital Council)**
**Keynote AWS: Railway innovation through cloud computing by Cameron Brooks (Public Sector Director Sales Europe)**

## Presentations

**Presentation of ECOPMS project by Olivier MAUREL (CEO MCLEDGER)**
**Presentation of BDTM project by Alexey OZEROV (Head of International Department JSC NIIAS)**
**Presentation of Project DIGIM II- Connected Level Crossing- UIC and Dassault Systems**

## The fifth UIC Digital Awards

**Introduction by Francis BEDEL**
**UIC Digital Awards 2020 winner in the Productivity category: Mindsay- Presenter: Guillaume Laporte**
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## Conclusion

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## Conclusion

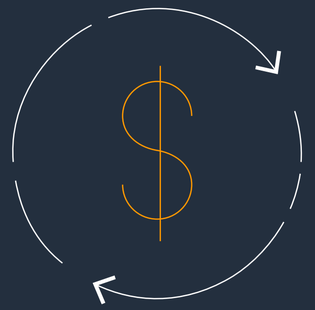
# AWS in Railway

Cameron Brooks

cjbrooks@amazon.com

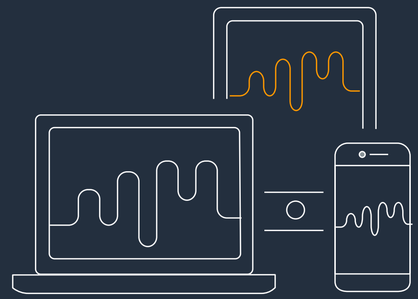
Public Sector Director Europe

# Railway Industry Corporate Objectives



COST
Operate in the most efficient way

SECURITY
Protecting customers and workers

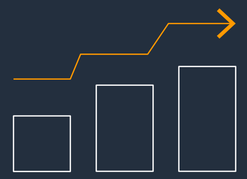


CUSTOMER
Bring more services and value to customers

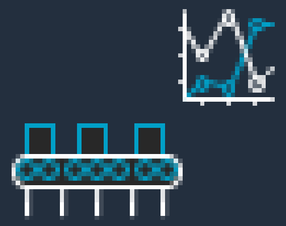


aws

# Railway Industry Challenges



Increasing competition



Preventive/ Predictive maintenance

Mobility as a service

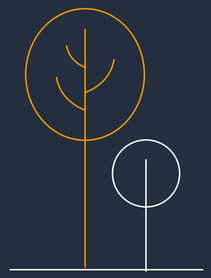
Data as an enabler

Cost reduction

Worker attrition and training

Protecting and securing employees and customers

Autonomous Trains



Sustainability



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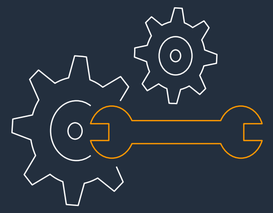
# What is Cloud computing ?

The term "cloud computing" refers the on-demand delivery of IT resources via the Internet with pay-as-you-go pricing

# Achieving business value with cloud computing

## Cost Savings (TCO)

Moving from Capex to Opex, paying only for what you use



## Staff Productivity

Increase staff productivity by focusing on added value tasks

## Operational Resilience

Benefit of improving SLAs and reducing unplanned outages

## Business Agility & Innovation

Deploying new features/ applications faster and reducing errors

Cost

Value



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# Case study: Predictive maintenance

## Challenge

- Ensure quality and safety of network
- Moving from preventive to predictive maintenance to detect anomalies in real time

## Solution

- Develop, and deploy innovative computer vision solutions using AWS Machine Learning solutions to analyze pictures from trains

## Benefits

- Save nearly a million dollars in software, hardware, and maintenance over 5 years
- 71% savings compared to the on-demand using SPOT instances
- Training time of the model was reduced from 3 days to 10 hours

"By using AWS, training time of the model was reduced from 3 days to 10 hours."

Samuel Descroix, Data Analytics Manager

Source https://www.lemagit.fr/ezine/Applications-et-donnees/Applications-et-Donnees-10-SNCF-Reseau-optimise-ses-algorithmes-avec-le-cloud
https://www.cio-online.com/actualites/lire-sncf-reseau-entraine-des-algorithmes-de-reconnaissance-d-image-dans-le-cloud-12520.html



Industry: Railway

Headquarters: Saint Denis, France

Employees: 275,000

Website: https://www.sncf.com

**About SNCF**

SNCF is the railway operator of France, founded in 1938 and employs more than 270,000 people to help travel 15M travelers daily. SNCF Réseau is a subsidiary of SNCF that manages and operates the infrastructure for the rail network (32,000 km /20,000 mi of routes).

# Case study: Improve service reliability and innovation

## Challenge

- How to utilize data from different sources to improve service reliability and innovation

## Solution

- VR FleetCare ingests their Internet of Things (IoT) data using AWS serverless services
- VR FleetCare then simplified reports using AWS data analytics and machine learning to store and analyse its data

## Benefits

- VR FleetCare launches new projects ten times faster using AWS as compared to their on-premises configuration
- VR FleetCare is using reports to do predective maintenance to detect anomalies before it happens

> “With the AWS cloud, we achieved cheap storage, great flexibility and scalability”
>
> Veli-Matti Ojala (Solutions Architect – Data & IoT, VR FleetCare)

Source https://www.youtube.com/watch?v=fpDwV5wge_k

Industry: Railway

Headquarters: Helsinki, Finland

Employees: 7,500

Website: https://www.sncf.com

**About VR**

VR Group, commonly known as VR, is a government-owned railway company in Finland. VR's most important function is the operation of Finland's passenger rail services with 250 long-distance and 800 commuter rail services every day.

VR FleetCare offers VR group and it's customers maintenance and modernization services.

# Case study: Mobility as a Service

## Challenge

- Mobility landscape in the cities is gaining complexity, citizens have a lot of options: car-, cycle-, and scooter-sharing,  private vehicles, licensed taxis, and public transport.

## Solution

- Mobility-as-a-service (MaaS) technology is helping residents and visitors in Berlin, Germany have access to the Trafi platform as single destination for all their transport requirements.

## Benefits

- Focus on development of the product, continious innovation due to new services launched by AWS
- Reduced infrastructure management and cost

"Thanks to AWS, we can deploy a new solution—including dozens of different services, databases, and other infrastructure resources—in less than a day."

Benediktas Poviliunas, Head of Engineering, Trafi

Trafi

Industry:  Mobility Startup

Headquarters: Vilnius, Lithuania

Website:  https://www.trafi.com/

**About Trafi:**

Trafi is a mobility startup, headquartered in Vilnius, Lithuania. Launched in 2007 Trafi offers cities the possibility to connect all mobility services to one single platform where users can not only check itineraries but also book their tickets and trips.

# Case study: Cost optimization with cloud computing

## Challenge

- Deutsche Bahn (DB) found that operating it's own IT infrastructure is no longer the core business of an IT service provider within the DB Group and should therefore be completely terminated as in-house production.

## Solution

- Decision to migrate to the cloud in 2017, over the years migrating around 450 applications, legacy systems and business critical applications like SAP

## Benefits

- Moved from hierarchical organization to agile cloud and DevOps teams
- Empowered innovation
- Increased flexibility and reliability, ressources available on demand
- Operational cost savings overall >20%

"Overall, migration into the cloud is well worth it for all applications. The business case refinances itself within three years.."
Robert Arnhold, Program Director of ShapeIT, DB Systel

Source https://digitalspirit.dbsystel.de/en/rapid-cloud-migration-a-preliminary-assessment/ https://digitalspirit.dbsystel.de/en/rapid-cloud-migration-a-preliminary-assessment/



Industry: Railway, Logistics

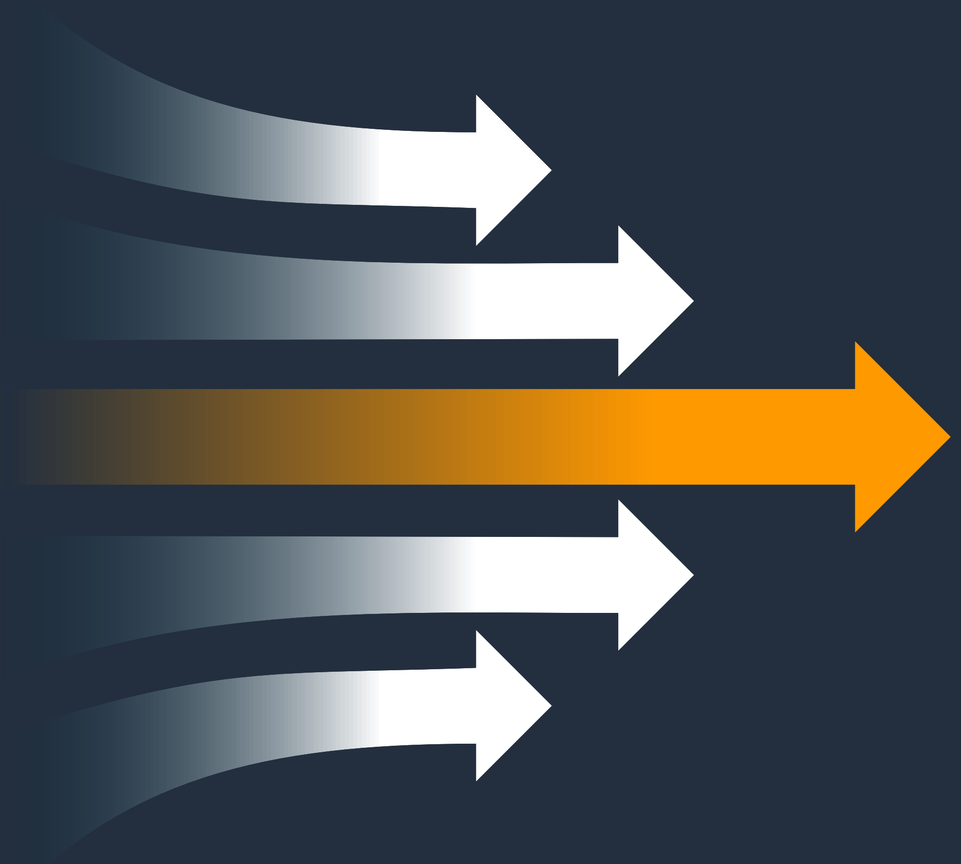
Headquarters: Frankfurt/Main, Germany

Employees: 324.000

Website: https://www.deutschebahn.com

**About DB**

DB own IT provider DB Systel is driving digitalization across DB. It has approximately 5,000 personnel, who are employed across its three main locations: Frankfurt, Berlin, and Erfurt.



# Next steps

Best Practices to a successful cloud migration

1. Get Stakeholders and Senior Leaders Aligned
2. Set Top-down Quantifiable Goals
3. Trust the Process
4. Choose the Right Migration Pattern: The 7 R’s



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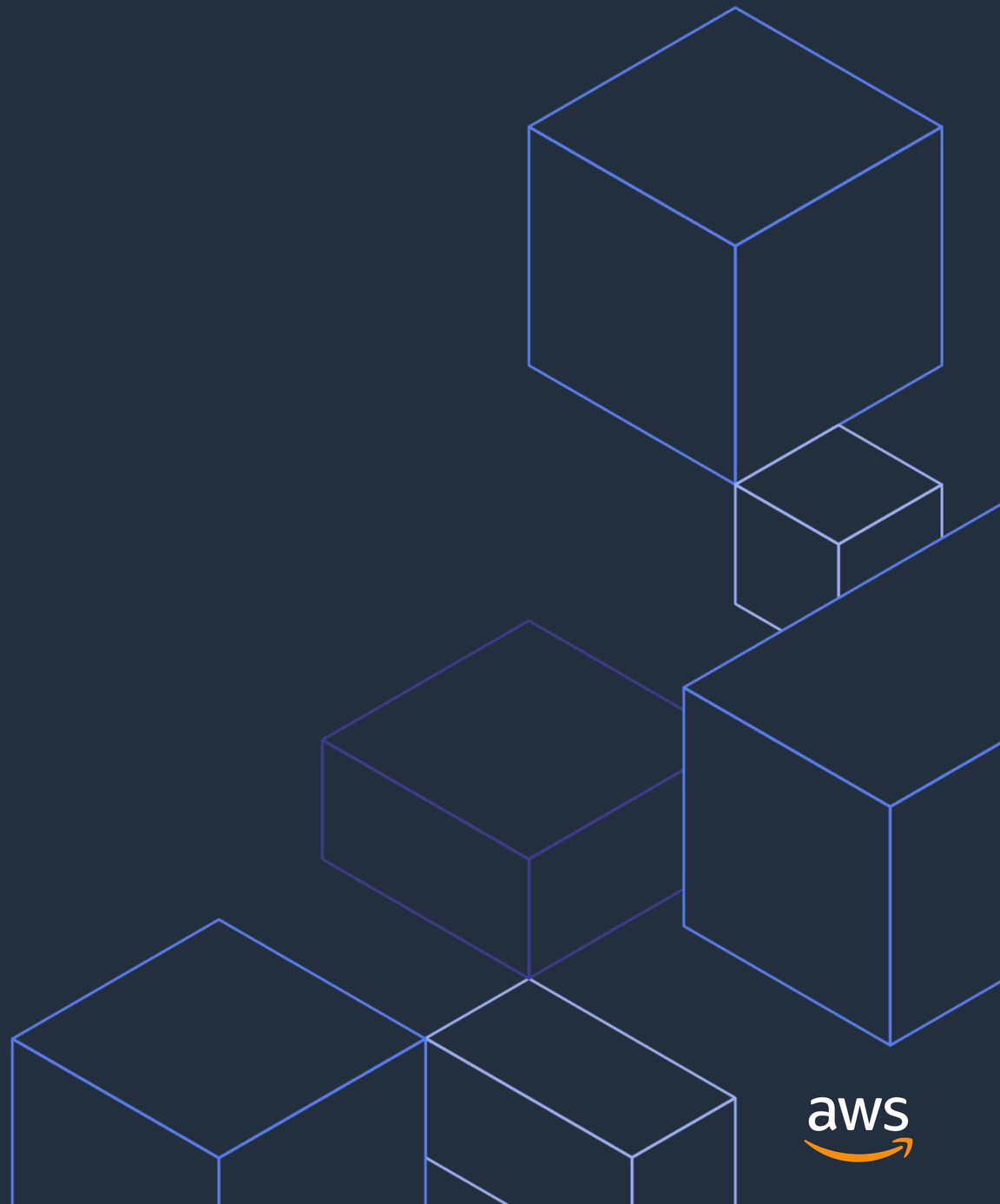
# Thank you.



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# MCLedger Presentation

## 6th UIC Digital Conference-
## December 11th

12/11/2020

ecopms

GIE ecopms
POUR UNE LOGISTIQUE MULTIMODALE RESPONSABLE

# ECOPMS project presentation

*ECOPMS Smart digital platform for eco-responsible logistics*

ADEME Agence de l'Environnement et de la Maîtrise de l'Energie

INVESTIR L'AVENIR LE GRAND PLAN D'INVESTISSEMENT

NOV@LOG LE PÔLE DE COMPÉTITIVITÉ LOGISTIQUE Partenaire

Systematic Paris Region Deep Tech Ecosystem

# ECOPMS, what ambition?

**ECOPMS is the simplest digital solution for managing alternatives to road transportation.**

We allow all professionals **to use multimodal rail and river transport as a "green" alternative to the road.**

# ECOPMS Project

Partners

Labels

ecopms

ECOPMS Smart digital platform for
eco-responsible logistics

**Eco-responsible**

**Multimodal**

**Control tower**

**Digital**

**Innovative: AI & Blockchain**

# Multimodal transport

## Mutimodal transport is a logistic solution for a greener transport

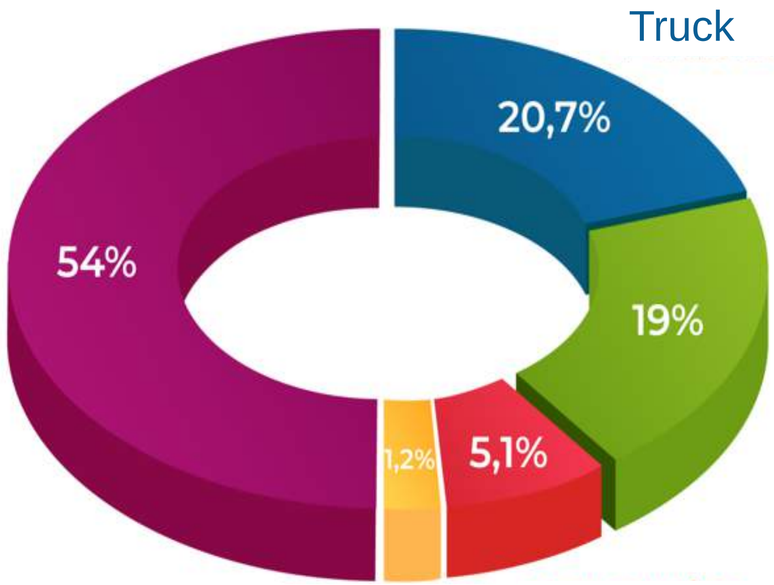
1 train
*3 tonnes of CO2*

=

45 trucks
*44 tonnes of CO2*

93% less CO2

**GHG emissions from transport in France**




Source : AEE, 2018

*Source: ecologique-solidaire.gouv.fr/transport-combine, 2020*

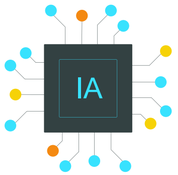
# Our Goals

## Promote the use of multimodal solutions via digital technology rather than using the road as the only mode of transport

**Make better use of existing infrastructures with digitalization** (without heavy investment)

**Providing information** to improve visibility, reliability, quality & interoperability

**Increasing cost competitiveness** with other transport modes




**Offering value-added services** already provided by competing modes (road)

# Control tower

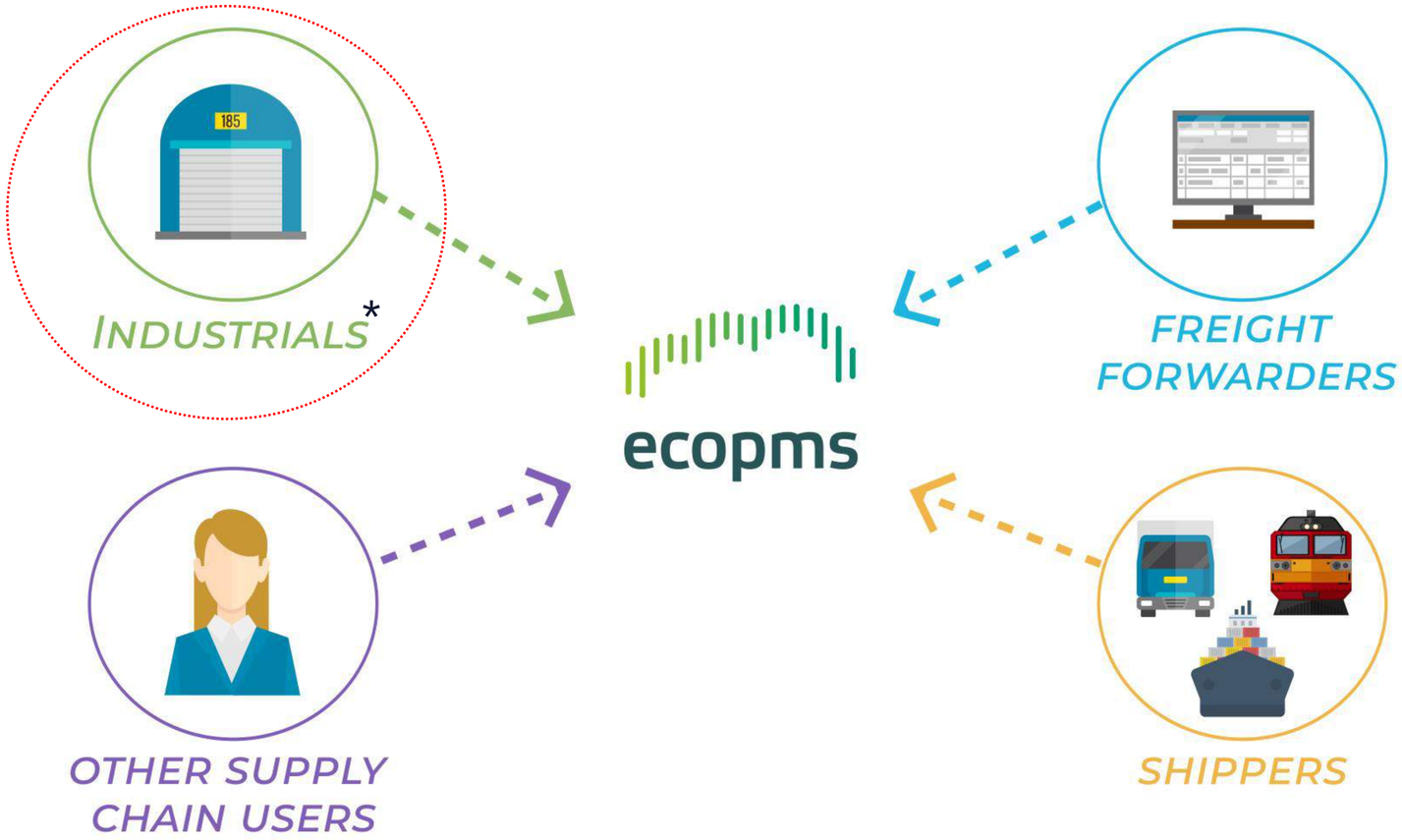
ECOPMS works as **a digital control tower facilitating the use of rail, river & road to save as much Co2 as possible**


| Problematics | Responses |
|---|---|
| Rail transport poorly connected to the supply chain | Create a « true » ecosystem |
| **Intermediate reloading** | **Ease of information exchange** |
| **Lack of visibility and reliability** | **Information tracing, data sharing & exchange** |
| **Complex Pricing** | **Readability & Cost control (wagons, damage, penalties)** |

**ECOPMS is a scalable platform with the ability to aggregate and deliver content from other logistics solutions**

# Ecopms Customers

**Main target**




First customer: 06/2020

**Industrials such as Danone, Nestlé-Waters, Michelin, BASF… representing for us about 10K potential customers over EU*

# Operating model of Ecopms

Multimodal Plan Transport management Provider (Rail/River) selection

Pre-Production : Road pre routing, Empty management, Multimodal site operations

Transport Closing Bonus/Malus, CO2 calculation, Pre Invoicing, ERP link

Manufacturer /Industrial


Supply Chain Customers

Connection to Ecopms Platform

Freight Forwarders

Loading Fleet operations

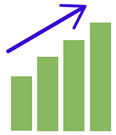
Shiping & Tracking

Data Mining

Transport Booking and planification

Multimodal transport , ETA calculation, Tracking/Tracing, Data collection from 3rd party (GPS, Customs,..) – Fleet Management

# Direct ROI for our first clients



Higher productivity
> integration of Supply Chains
- Reduced workforce, cost cutting

Better use of information
= Quality improvement
= Cost reduction

Ability to apply
a bonus-malus policy

Improved carbon
footprint
(linked to the CO2 value)

| | | | |
|---|---|---|---|
| **5 to 20 %**<br>of the tender:<br>Transport Procurement Cost Cutting | **10 to 25 %**<br>of these costs:<br>Internal Operational Cost Reduction | **0 to 5 %**<br>of the Transport Global Costs | **30 %**<br>Carbon footprint |

**Better access**
to the Multimodal offer -
Call for tender management

Better information results
improved reliability and
greater visibility

More options for transport
(multimodal) offers **Cost Savings**
and **Greater Efficiency**

# Ecopms Awards

- Winning project as part of Investment program of the future (PIA) operated by **ADEME**

- Presented by H2020 **Smart Rail Project** (636071) **at COP 21**

- Project labeled by **NOVALOG**

- Project with **EIP Label by SYSTEMATIC**

# Demo product : ECOPMS

Watch the video of the Manufacturer / Industrial version Platform

# Contacts

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+33 (0)6 82 59 85 98

Françoise Meurillon - CFO

francoise@mcledger.io

+33 (0) 84 21 18 47

# ECOPMS appendices

# Our product : ECOPMS Forwarders version

Watch the video of the freight forwarders version platform

# Manufacturer / Industrial Use Case

## “Choice of rail transport made simple and efficient”


### Challenge

- **Negative experience:** too specific, low reliability, not integrated with the supply chain
- **Conditional usage:** if it’s convenient and good for my carbon footprint
- **Complexity – interface in rail transportation are the key factor for efficiency**

### Solution with ECOPMS

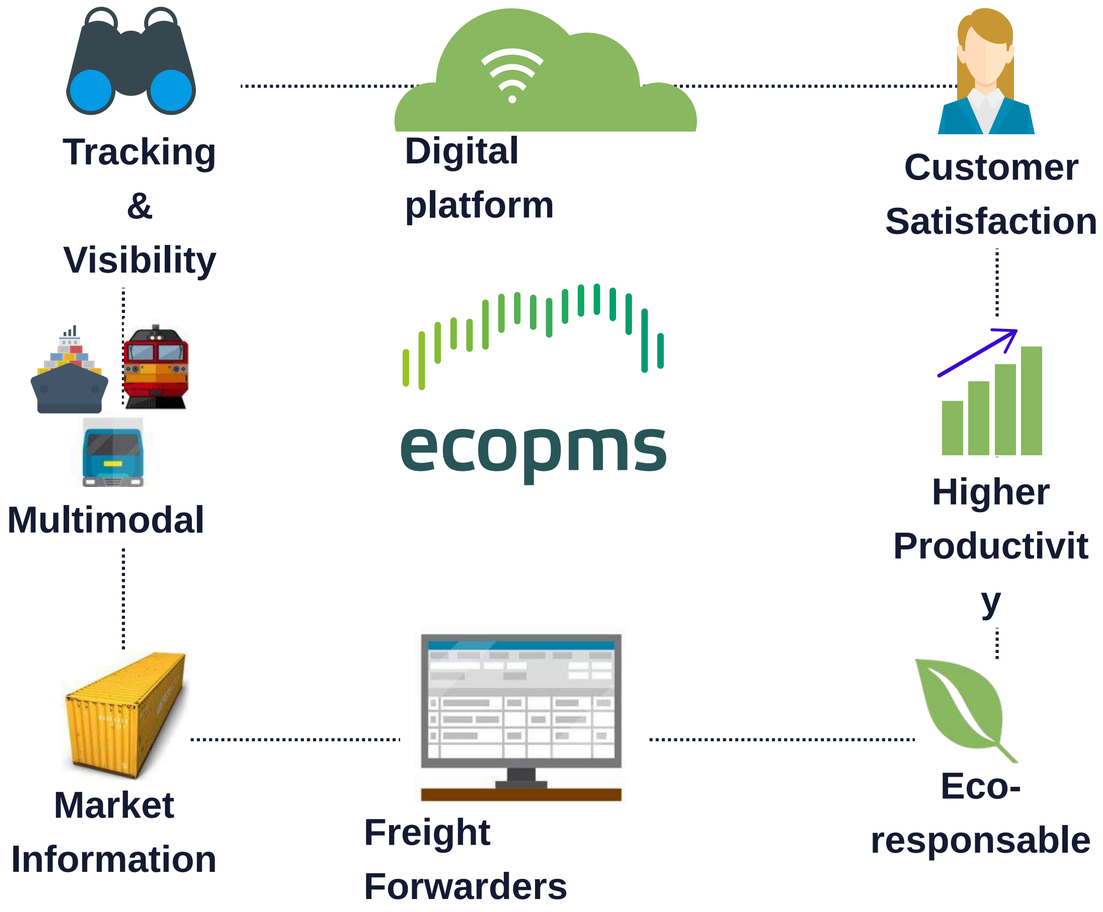
- **A single place** to manage rail flows from tender to execution
- **All players** in the supply chain share information, adding visibility
- The platform can **interface with production ERPs** and transport tracking systems (one-stop shop, customs)
- **Wagon fleet management** fully integrated allowing to minimize repair cost

### Results

- **Higher productivity** through integration
- **Better reliability** due to **better visibility**
- Ability to apply **a bonus-malus policy** - **Improved carbon footprint**
- More options for **transport** - **Lower cost and better efficiency**

# Freight Forwarder Use Case

## “We will offer multimodal transport if it’s as simple as road transport !”




### Challenge

- **Hard** to know what is available
- You have to be **an expert**
- Rail is **complicated, unreliable,** and availability information is **not readily available**
- **Yes,** if it’s convenient because **customers are interested**

### Solution with ECOPMS

- A **single place** to find the **market information from the RUs**
- **Strong integration** with the supply chain
- **Wagon fleet management** including maintenance
- The platform can **interface all transport tracking systems** (one-stop shop, customs) and offer **360 visibility** of operations

### Results

- **Higher productivity** through integration
- **Better customer satisfaction** due to **better visibility**
- Higher profitability, lower cost
- Best carbon footprint

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## Conclusion

JSC NIIAS

JSC Research & Design Institute for Information Technology,
Signalling and Telecommunications on Railway Transport

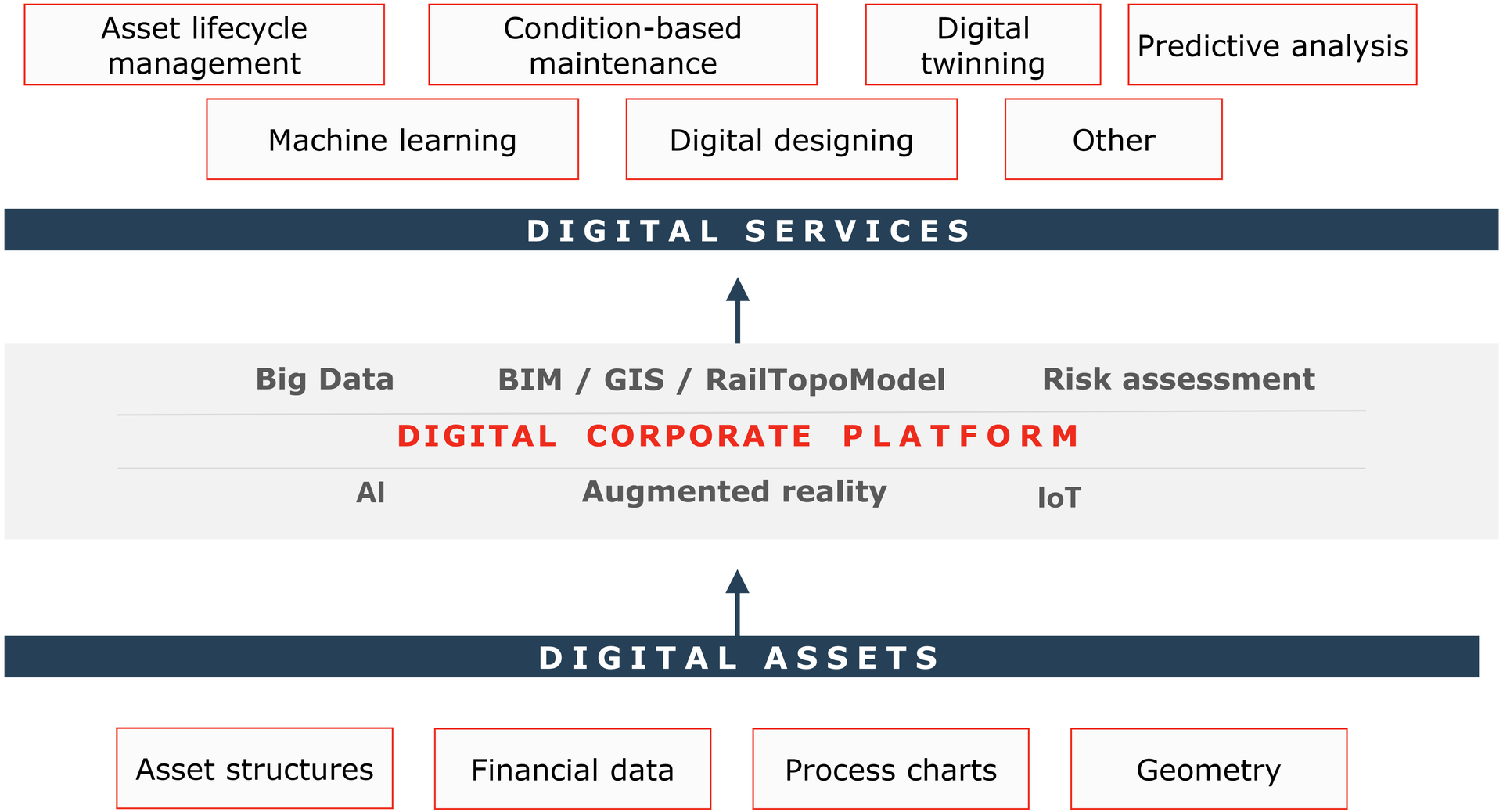
INTERNATIONAL UNION
OF RAILWAYS

# BIG DATA BASED TIMETABLE MANAGEMENT

Alexey Ozerov
Head of International Department,
NIIAS

VI UIC DIGITAL CONFERENCE
11 December, 2020

# RAILWAY DIGITALIZATION



# BIG DATA IN RAILWAYS

## Big Data in rail industry:

- Customer profiling and train operator’s marketing and revenue management activities;
- Passenger demand forecasting and transport planning;
- Network and traffic optimization;
- Predictive maintenance and asset management;
- Predictive analytics for safety monitoring, analysis and planning.

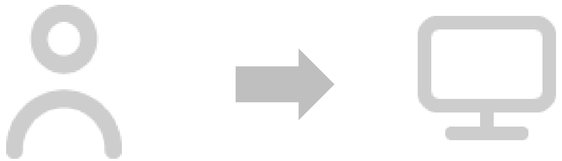
## Big Data benefits:

- Rapid insights from disparate sources of information to help improve asset availability;
- Reduction of service delays caused by unplanned outages;
- Reduction of human impact;
- Maintenance cost reduction;
- Improvement of railway passenger and freight services;
- Transition to adaptive planning.

## Big Data constraints:

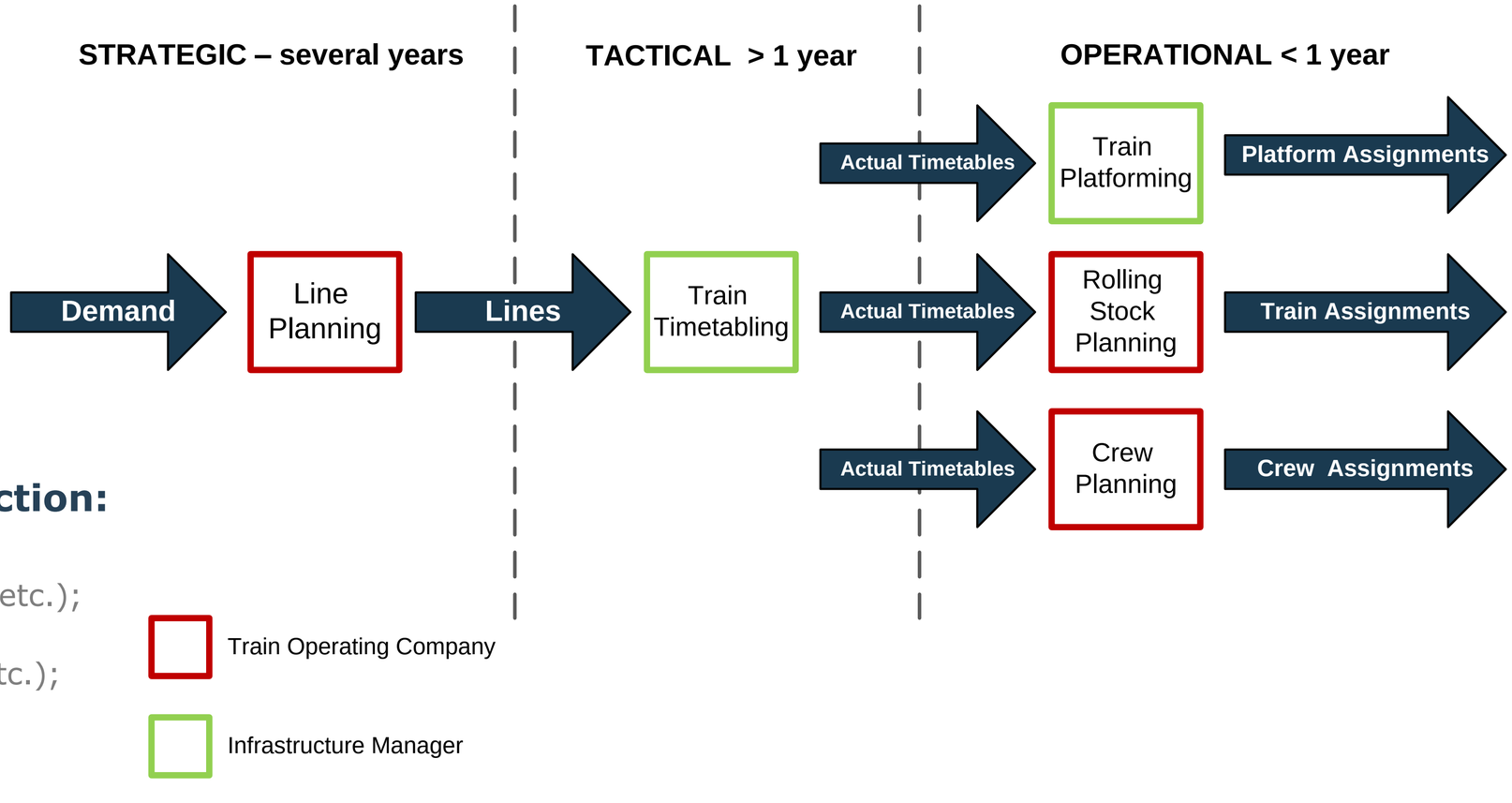
- Big Data will still require data scientists and railway experts to validate models generated by machine learning applications;
- Big Data will not convert manual reporting systems into automatic ones;
- Big Data cannot process and create information without meaningful data.

# TIMETABLING



Manual construction

Digital construction




## Data required for timetable construction:

- Rolling stock
  (type of locomotive, train length, type of car, etc.);
- Railway infrastructure
  (location of signals, switches, type of track, etc.);
- Train running times between stations;
- Station intervals;
- Technical stops;
- Arrival and departure time;
- Volumes of passengers, etc.

# HOW CAN WE AUTOMATE/DIGITALIZE TIMETABLING?

**Railway timetable** must provide competitive travel times and at the same time be able to withstand delays, perturbations, and variations in operating conditions without losing functionality, to achieve a high service level during operations.

[M.P. Goverde and Ingo A. Hansen, Delft University of Technology, Netherlands]

**Train timetable** is a crucial document for organization of railway traffic. It describes railway infrastructure occupation of train movements in time and space.

[Pei Liu and Baoming Han, Beijing Jiaotong University, China]

**Timetable** is a key reference document for railways, which regulates all the aspects of operations at all levels of railway management, representing a network-wide plan of operations and being the basis of transportation management. At the same time it is the totality of schedules that may change and improve during a timetable lifecycle.

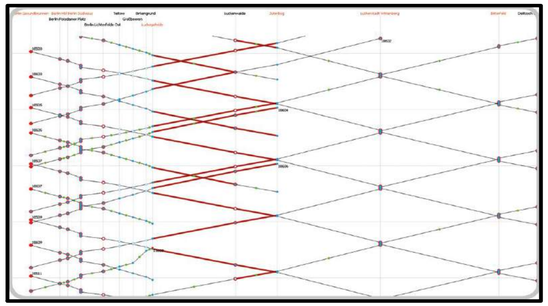
Type of rail lines, size of traffic etc.

Human Errors (incl. technological failures)

Failures of technical installations

Illegal interference

Weather disturbances (snow, heavy rains, wind)

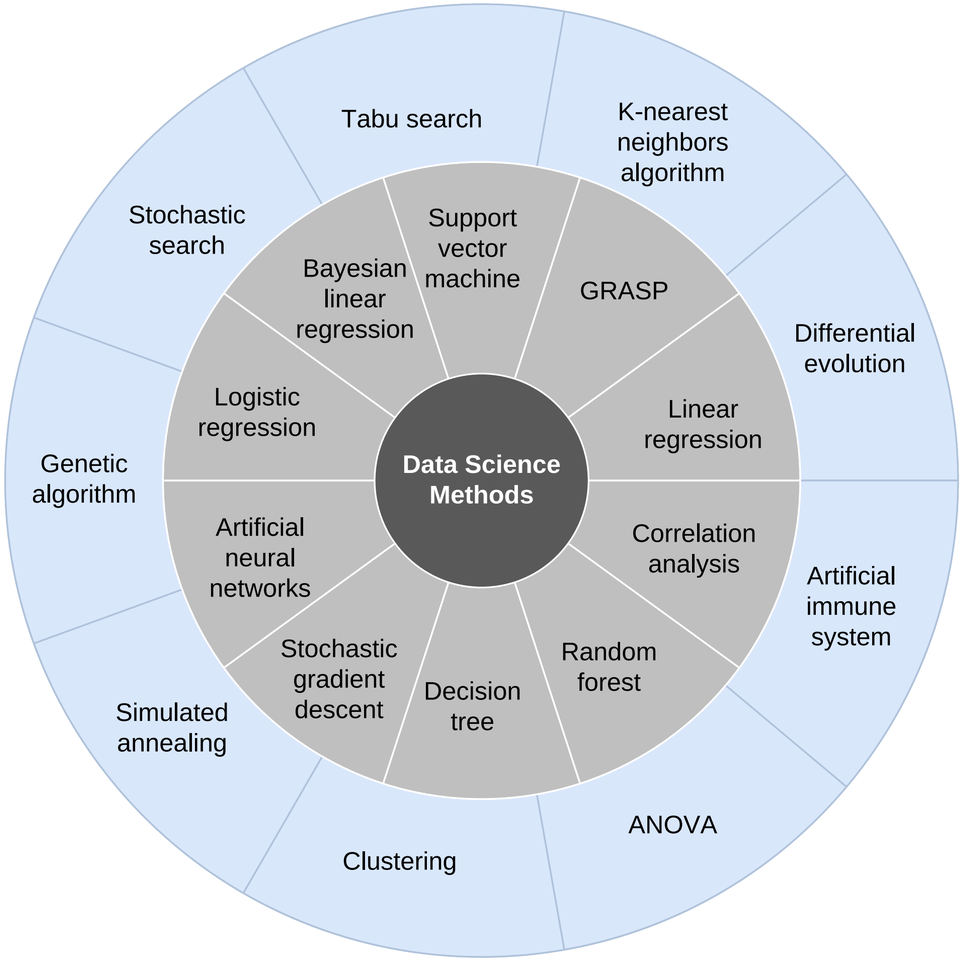


Timetable

# BIG DATA AND DATA SCIENCE METHODS

- Internet of Things (IoT)
- Cloud computing
- Data Science

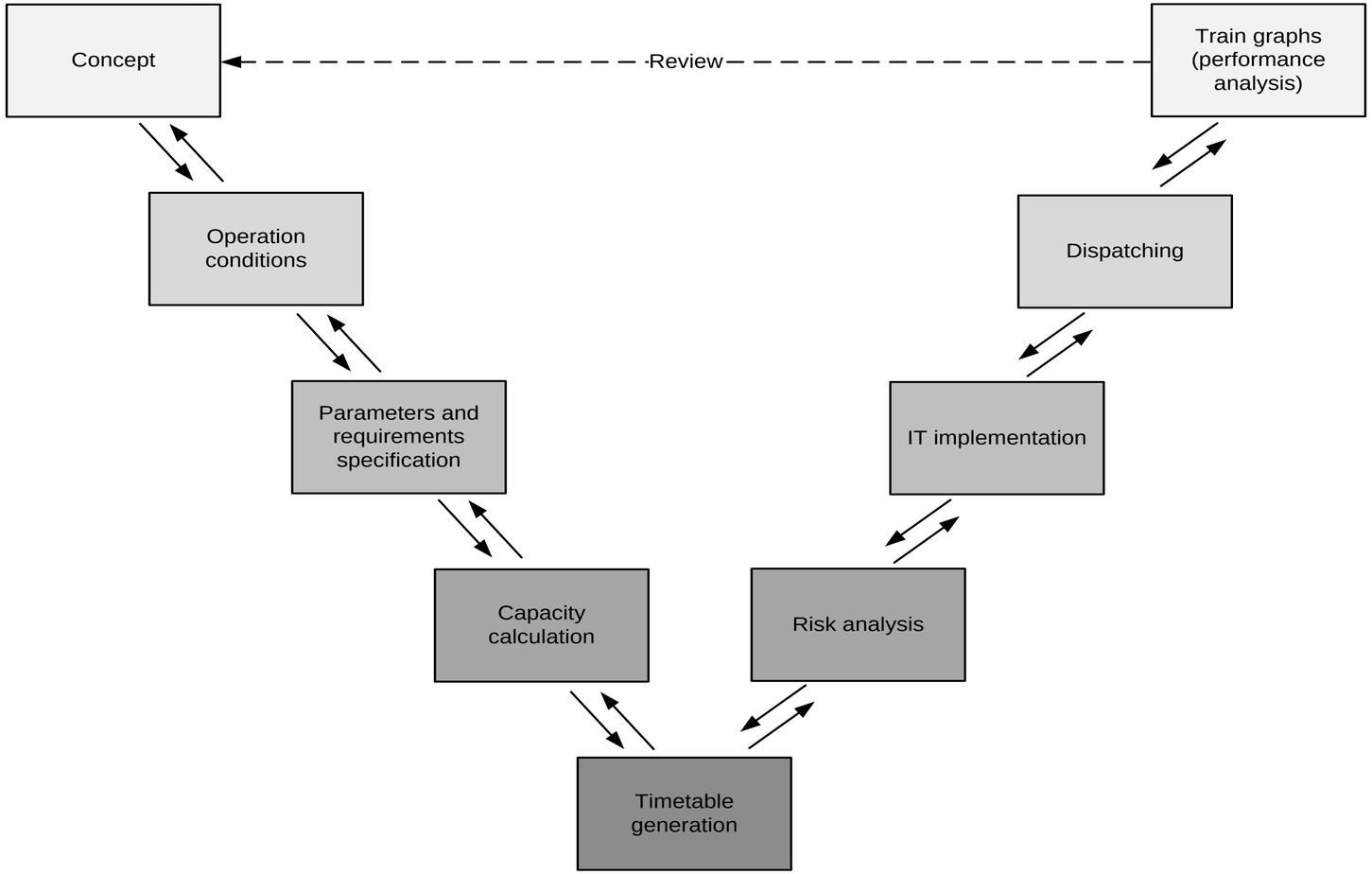
- Big Data
- Machine Learning
- ANN …




**Data processing requirements for Data Science methods application:**

- Data validation;
- Noise analysis, outliers removal;
- Updating and data cleaning;
- Data conversion;
- Data standardization;
- Validation of function types using historical data.

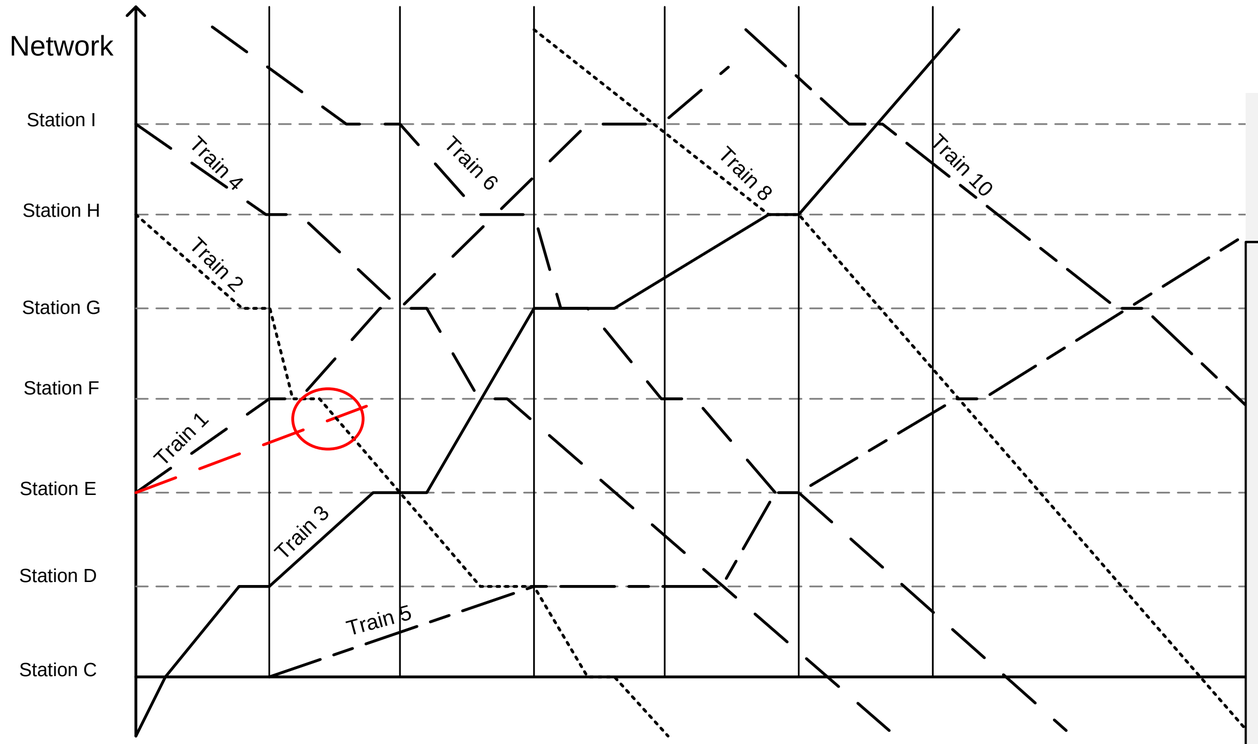
# TIMETABLE LIFE CYCLE

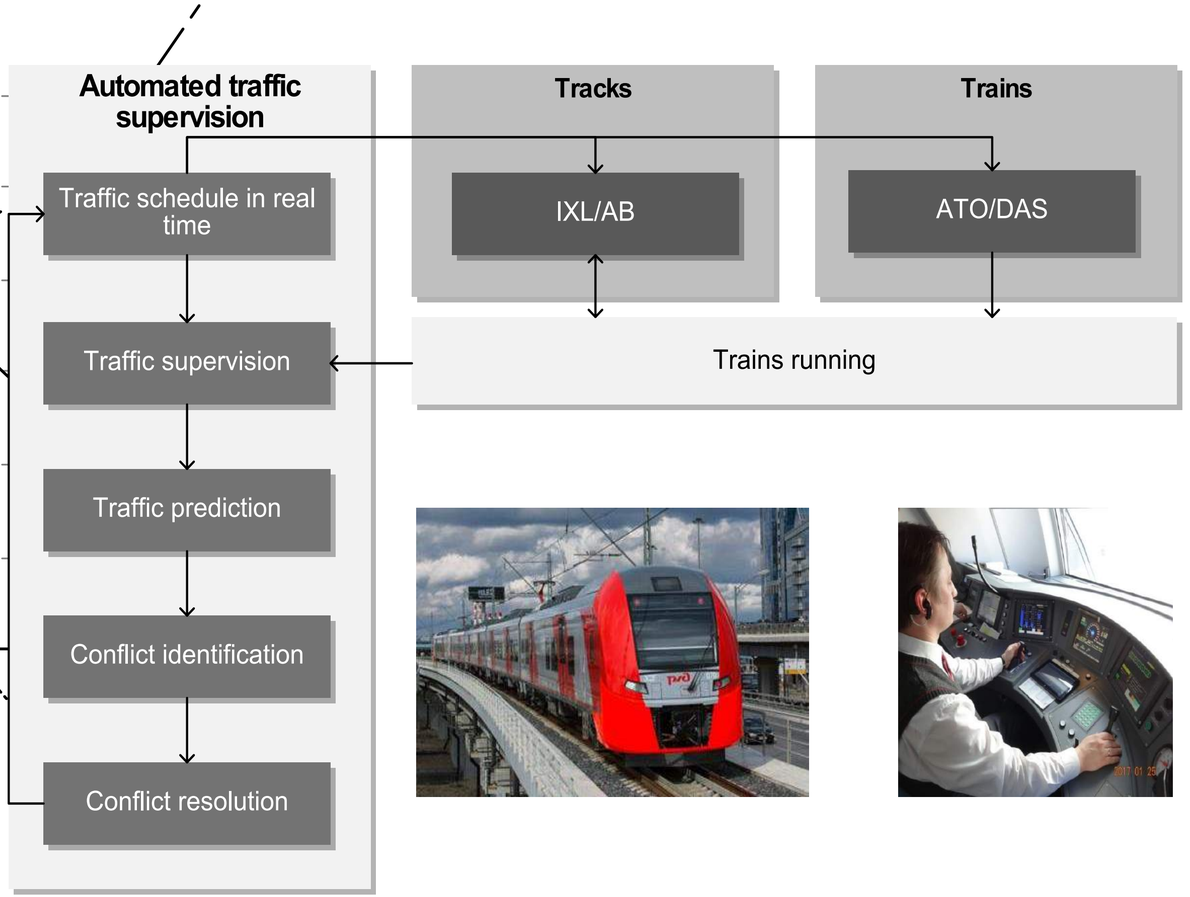



**The tasks that may be solved with the aid of automated intelligence and Data Science methods, including those based on self-teaching, at various stages of a timetable lifecycle:**

- Increase of timetable robustness (resilience to external disturbances);
- Possibility of constructing a common timetable for network parts belonging to several countries and for international transport corridors;
- Reduction of human factor impact on timetable construction and adjustment;
- Introduction of predictive properties in relation to possible failures, disturbances, as well as reduction of response time towards such disturbances, thus resulting in less costs of mitigating timetable deviations.

# TIMETABLING VS AUTOMATED TRAFFIC SUPERVISION



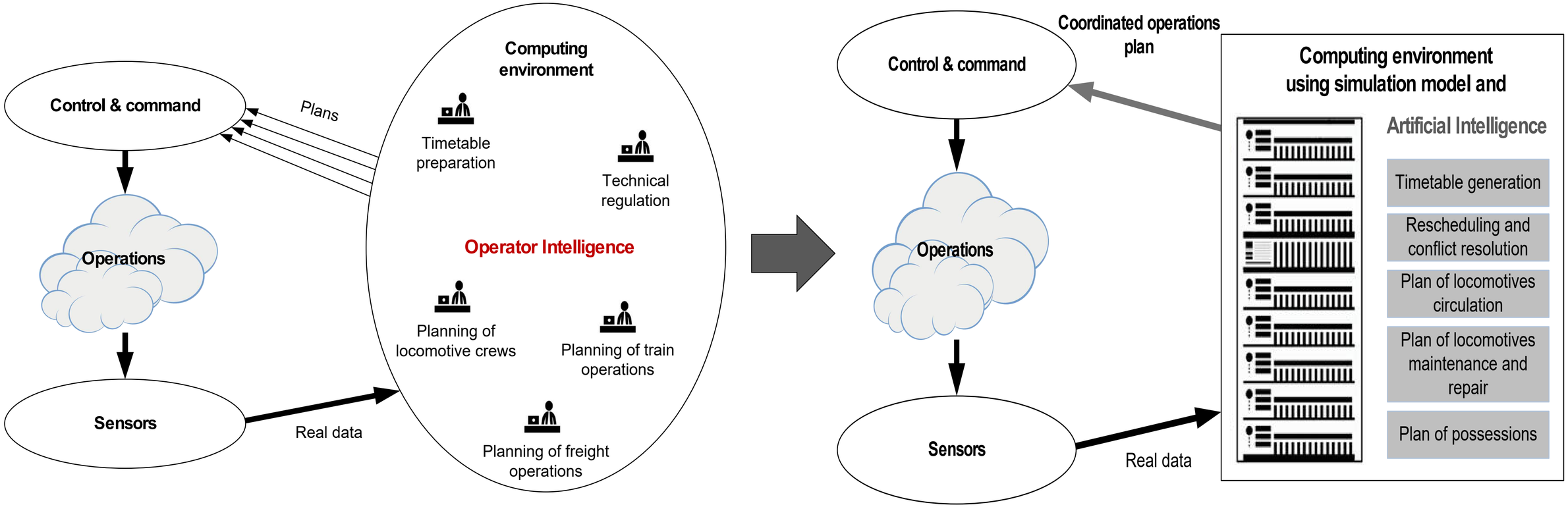








Ongoing migration to automatic train supervision and ATO (GoA3 - GoA4) are becoming new drivers for the introduction of AI-based timetabling and timetable management

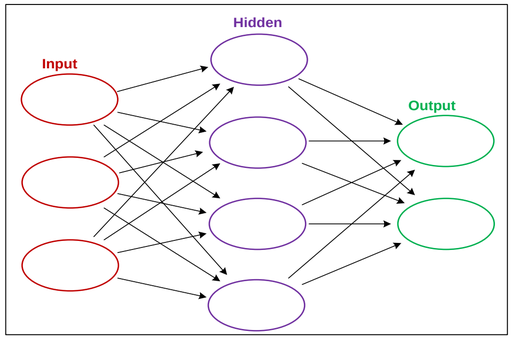
# TRANSITION TO AI-AIDED ADAPTIVE PLANNING



# BDTM DATA MODEL

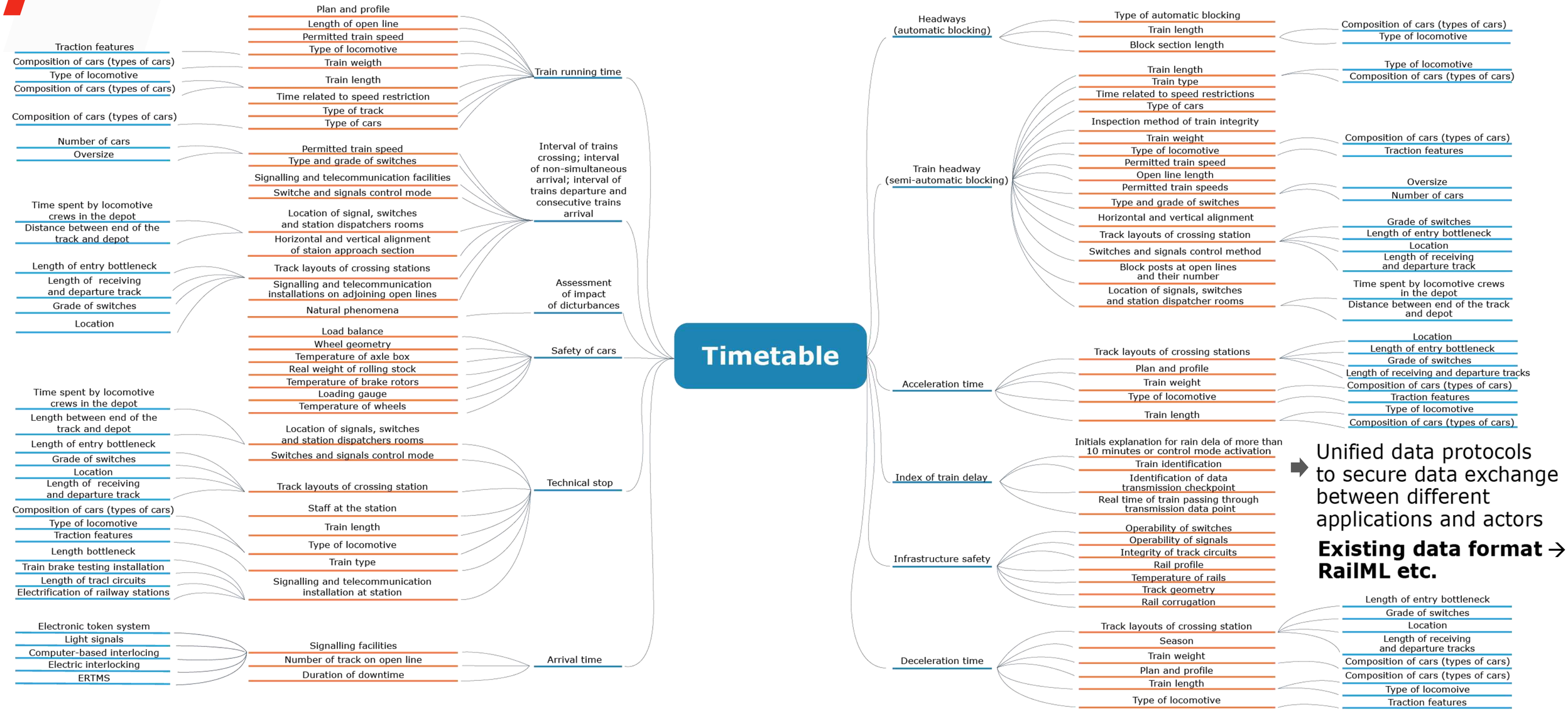
| Parameters | Data type | Factors | Nickname | Methods ML/DS |
|---|---|---|---|---|
| **Interval of trains crossing;**<br>**interval of non-simultaneous arrival;**<br>**interval of trains departure and consecutive trains arrival** | Integer | Track layouts of crossing or overtaking stations | TopTrackUpd | ANN |
| | | Signalling and telecommunications installations | AlarmsAndRel | |
| | | Interlocking types | CtrlSwSig | |
| | | Location of signals, switches and station dispatcher rooms | FamousPoints | |
| | | Horizontal and vertical alignment of stations approach sections | PlanProfRP | |
| | | Permitted trains speeds | MaxSpeedTrain | |
| | | Type and grade of turnout | SwTypeMark | |
| | | Signalling and telecommunications installations on adjoining open lines | TechOsnPegrStation | |

| Parameters | Factors |
|---|---|
| **Track layout** | Grade of switches |
| | Length of entry bottleneck |
| | Length of receiving and departure track |
| | Location |
| **Train weight** | Composition of types of cars |
| | Type of locomotive |
| **Train length** | Composition of types of cars |
| | Type of locomotive |
| **Type of locomotive** | Enumeration of traction features |
| **Permitted train speeds** | Number of cars |
| | Oversize |
| | Track specialization |
| **Signalling and telecommunications installations at station** | Length of track circuits |
| | Presence of brake charging and test operation device |
| | Length of bottleneck |
| | Electrification |
| **Location of signals, switches and station dispatcher rooms** | Distance between end of the track and depot |
| | Time spent by locomotive crews in the depot |
| **Signalling facilities** | Computer-based interlocking |
| | Electric interlocking |
| | Electronic token system |
| | Light signal |
| | ERTMS |




| Feature | Cold Data | Warm Data | Hot Data |
|---|---|---|---|
| **Interval of train crossing;**<br>**Interval of non-simultaneous arrival;**<br>**Interval of departure and consecutive trains arrival** | + | + | + |
| **Train running time** | + | + | + |
| **Headways with automatic blocking** | + | + | + |

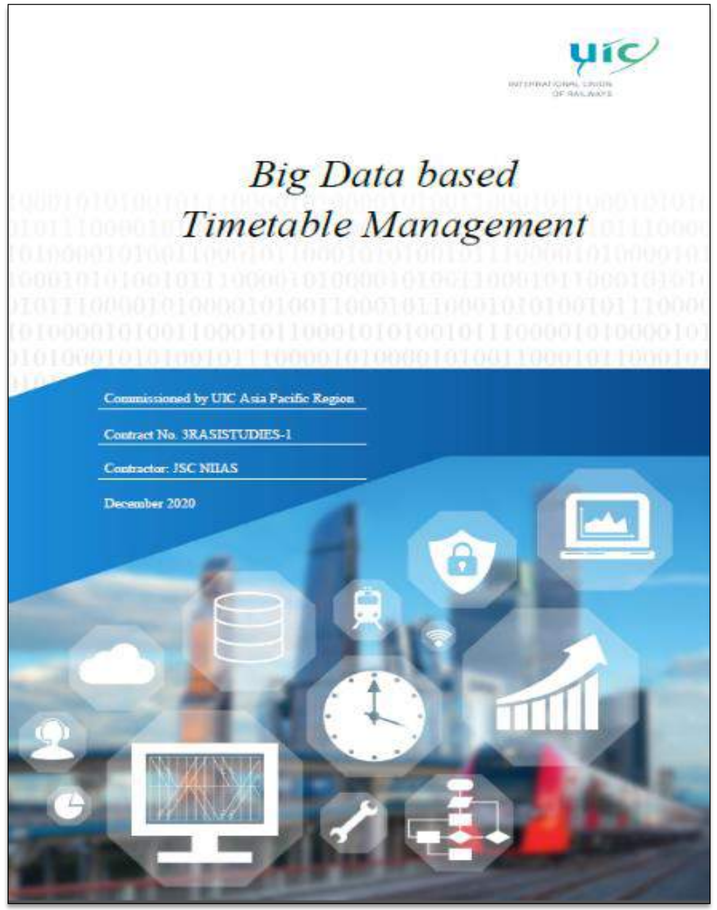
# BDTM DATA MIND MAP




Unified data protocols to secure data exchange between different applications and actors

**Existing data format → RailML etc.**

# UIC IRS POTENTIAL SCOPE




1. Standardization of the terminology and the concept of a timetable life cycle with specification of the stages where the recommended methods can be applied
2. Formalized description of timetable parameters and factors affecting them
3. Description of the requirements for databases and data storage tools (to secure transition to an adaptive timetable managed using advanced approaches)
4. Description of the requirements for hardware and software implementing Data Science methods (including mathematical and algorithmic components) for specific timetable aspects
5. Requirements for IT implementation of a timetable based on new methods
6. Requirements for safety checking of timetable solutions generated by Big data methods
7. Staff instructions for dealing with a timetable management system based on adaptive principles
8. Requirements for formalization of a data model related to a through planning and timetable generation and including all participants of the process
9. Requirements for labeling of a formalized data description of timetable parameters and factors affecting a timetable

JSC NIIAS

JSC Research & Design Institute for Information Technology, Signalling and Telecommunications on Railway Transport

INTERNATIONAL UNION OF RAILWAYS

# Thank you!

# Programme

Moderation by Simon Fletcher

## Introduction by UIC

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## Conclusion

INTERNATIONAL UNION
OF RAILWAYS

# DIGIM II

## Connected level crossing

**Parinaz Bazeghi**
Digital Project Manager

December 2020

# DIGIM II

DIGIM II project was launched in 2019

Eight participating members: SNCF, SBB, Network Rail, RAI, Via Rail Canada, Ferrovie dello Stato Italiane, CARS and Infraestruturas de Portugal and partnership with Dassault Systèmes.

The objective is to improve safety at level crossings by connecting them to their surroundings.

# DIGIM II

The emergence of new technologies and **connected infrastructures and vehicles** in recent years offers a new opportunity to increase safety at level crossings.

**Advanced Driver Assistance System(ADAS)**: “vehicle-based intelligent safety systems which could improve road safety in terms of crash avoidance, crash severity mitigation and protection, and automatic post-crash notification of collision."[1]

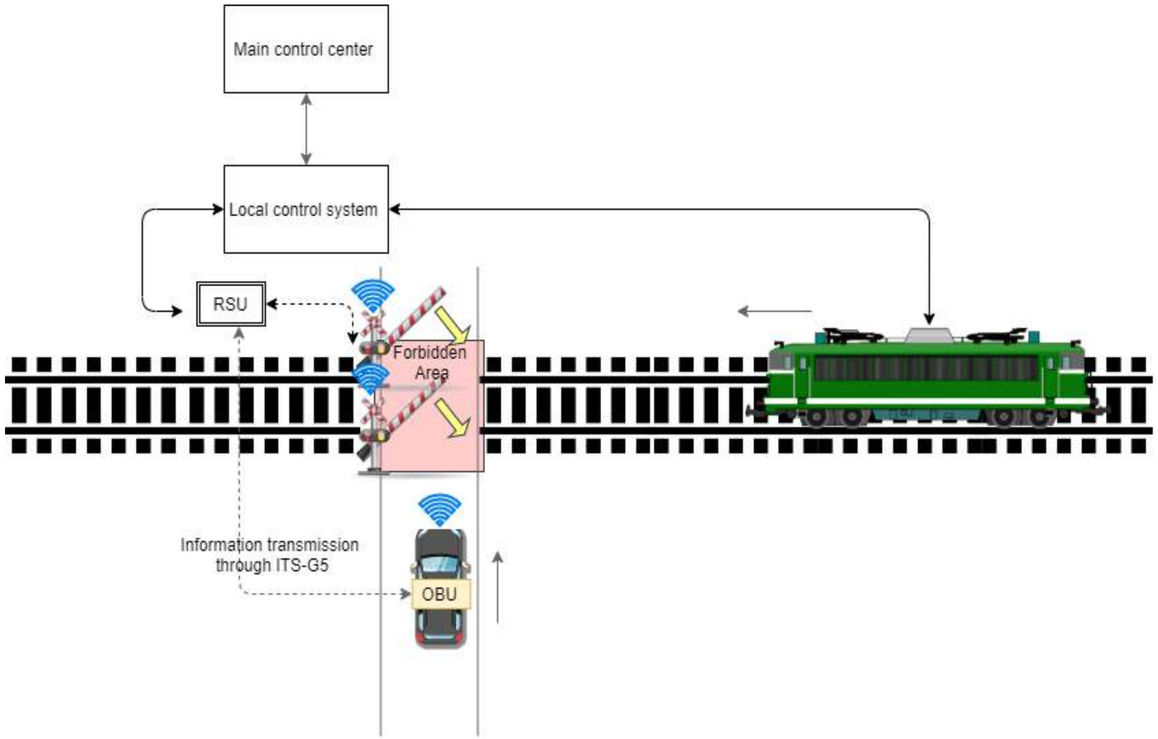
1: European road safety observatory report in 2016

# DIGIM II

We defined a proof-of-concept of a new ADAS to make cars act safer around level crossings, modeled it digitally in a 3D simulation software (3DEXPERIENCE platform) and evaluated its performance under different scenarios.

Level crossing is connected to cars to transmit them necessary information including level crossing's status.

If no action or insufficient action is taken by the driver in case of a closed level crossing, the car will take control of the system(ADAS), slow down and stop safely before the barrier.



# The next step

In DIGIM II an example of a simplified conceptual architecture of the system was designed, simulated and evaluated using 3DEXPERIENCE platform.

It showed that several simulation technologies could be connected together within the same digital platform, to define, study and simulate a complex system that connects a level crossing with an automobile.

In the next step, the potential cooperation with a car manufacturer will be evaluated to develop the system and possibly test the product in real environment.

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## Stay in touch with UIC:

www.uic.org


#UICrail

**Thank you for your attention.**

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## Conclusion

mindsay

# Customer Service Automation for Railways

UIC Winner in the Productivity Category

December 11, 2020

PART 1

# Solution Overview for Rail Companies

mindsay

OVERVIEW

# Global leader in Conversational AI for the Travel & Mobility industries

OFFICES

**Paris**

**New York**

OURS BOTS HAVE HELPED

**6M+ customers**

FOUNDED

**2016**

FUNDING

**$12M**

EMPLOYEES

**40+**

ENGINEERS

**30%**

ARR GROWTH

**4.5X/YR**

CLIENTS

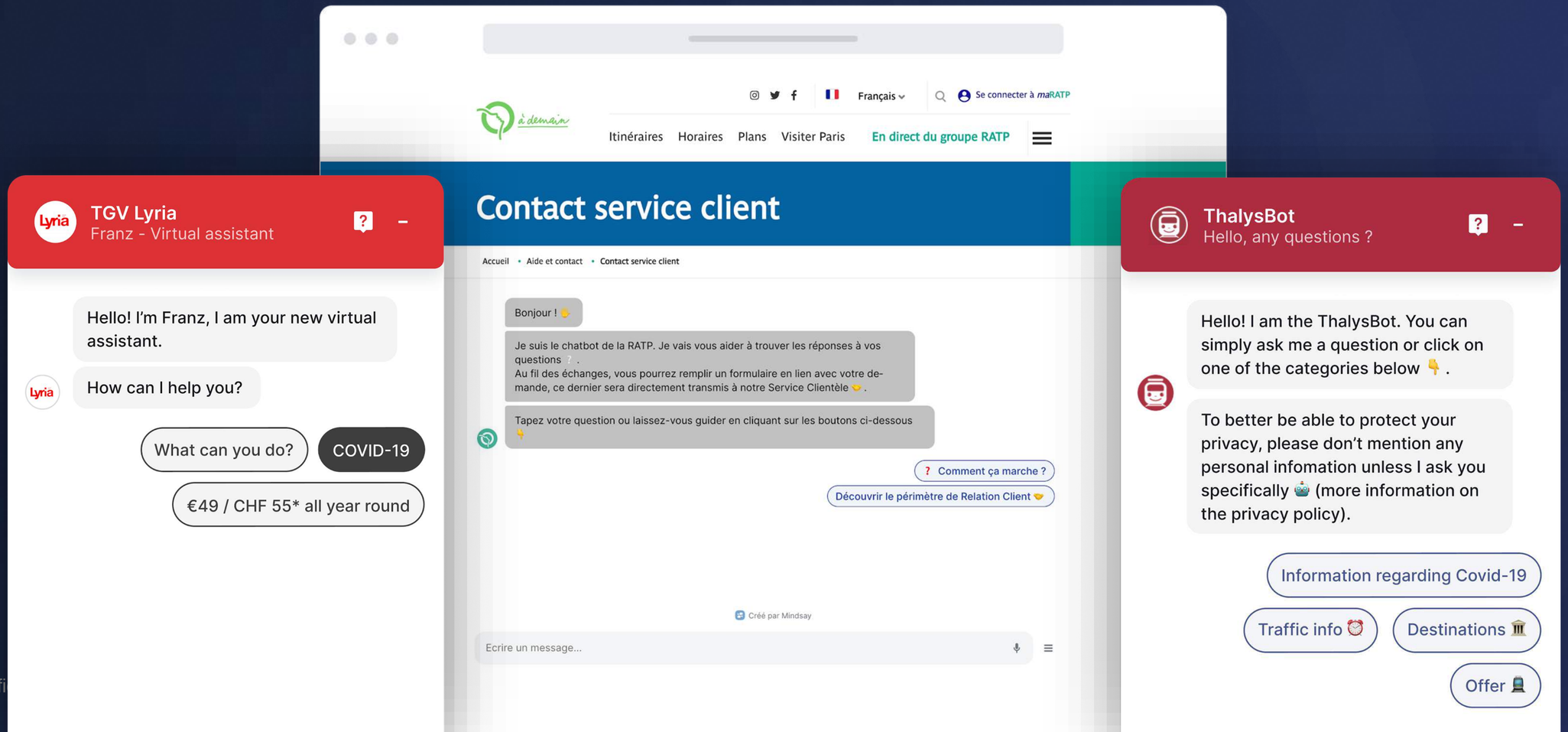
**30+**

OUR GOAL

# We help customer service teams overcome common challenges

- Automate large volumes of customer requests
- Eliminate time-consuming processes
- Optimize role of human resources

# Fully-trained AI chatbots specific to rail & mobility



# Why Mindsay for Rail?

## Library of Use Cases

Our bots are pre-trained using millions of rail-specific conversations.

## Low-Code Interface

Our platform is designed to allow both developers and business users to easily build, maintain, and improve their bots.

## Ability to Connect

Our travel-specific integrations allow you to connect with APIs and existing platforms.

PART 2

# Rail Customer Success Stories & Productivity Use Cases

mindsay

THALYS

CUSTOMER STORY

## USE CASES

- Exchanges & refunds
- Salesforce handover
- COVID info
- Train schedules
- Booking
- EU Destinations
- FAQs

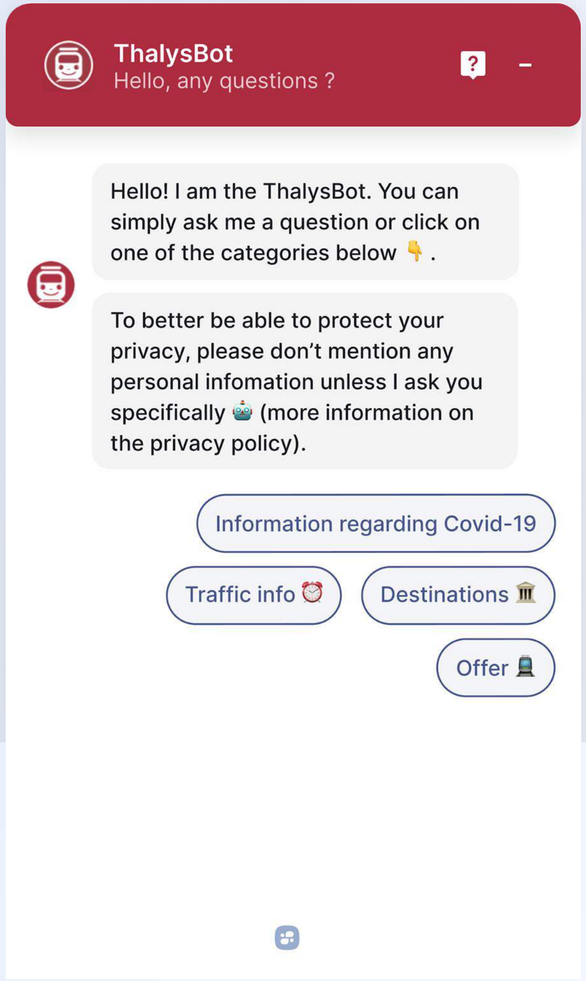
## RESULTS

**99%** automate rate

## TESTIMONIAL

“Mindsay’s technology allows us to constantly improve and innovate. Their integration with Salesforce significantly boosts our agents’ productivity and has cut down time to resolution. This ultimately allows us to better serve our customers.”

**Stephan Kramer**
Customer Service Program Manager, Thalys



CUSTOMER STORY

## USE CASES

- Itineraries
- Loyalty program
- Departure information
- Alerts
- Zendesk handover
- COVID info
- FAQs

## RESULTS

**50%** reduction in customer support tickets

## TESTIMONIAL

"We've reduced the number of requests our customer support team receives on Zendesk by 50%."

**Christine Daugeron**
Mobile App Director, SNCF

CUSTOMER STORY

## USE CASES

- Live transit info
- Alerts
- Station issues
- Commuter passes
- Itineraries
- Paying fines
- FAQs

## RESULTS

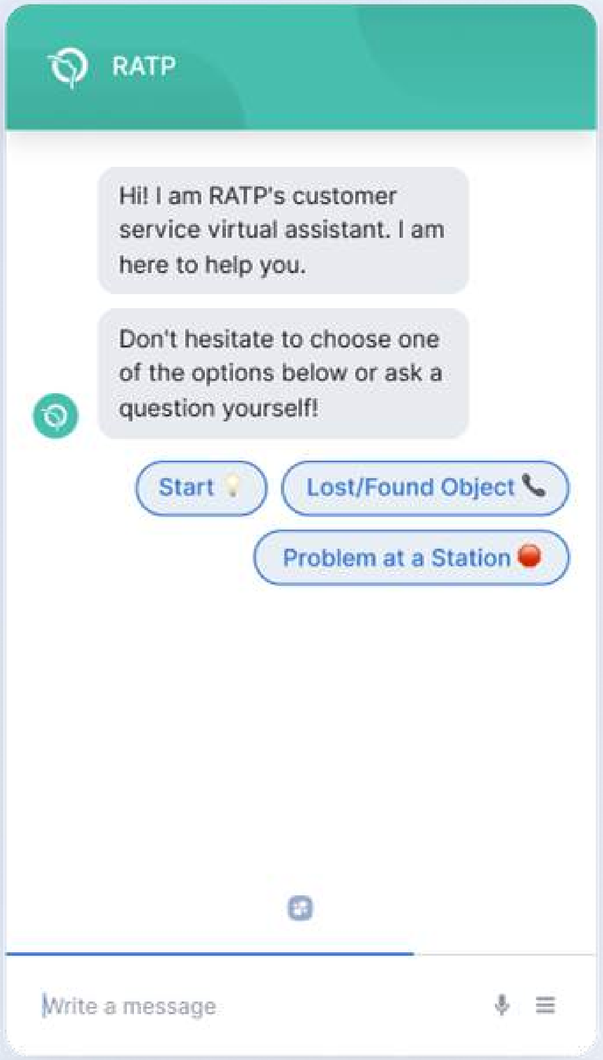
**$19.90** saved per customer request

**84%** of conversations automated

## TESTIMONIAL

“Mindsay has shown its ability to develop an innovative solution while integrating with our technical and regulatory constraints. They’ve been able to offer solutions for blocking issues while keeping in mind the need to streamline the customer journey.”

**Customer Service Exec**, RATP



TGV Lyria

CUSTOMER STORY

USE CASES

- Exchanges & refunds
- COVID info
- Train schedules
- Booking
- Onboard services
- FAQs

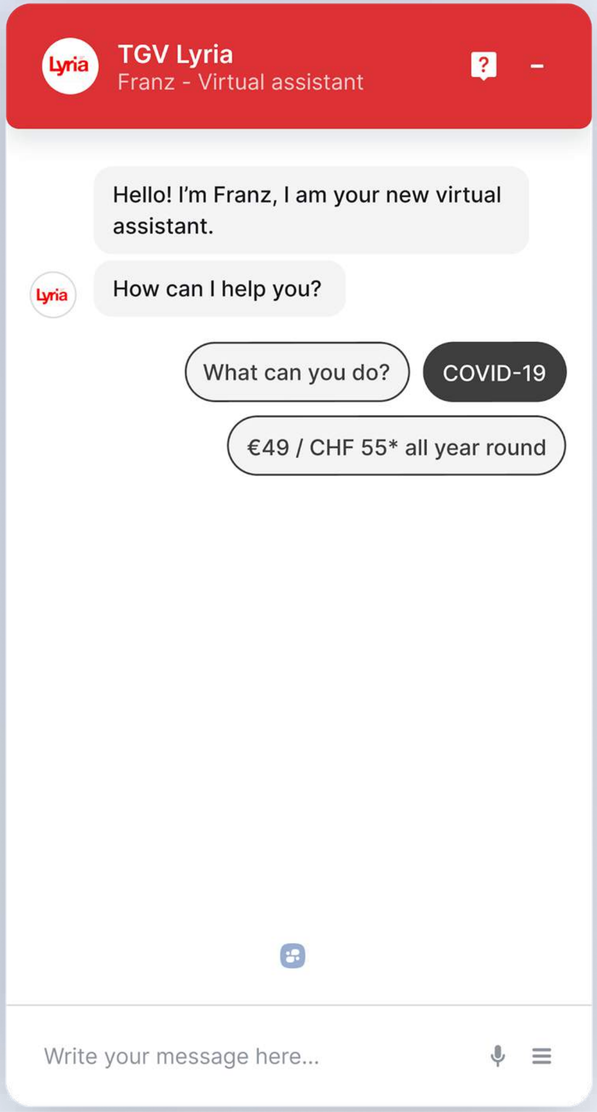
RESULTS

**2,000** customer requests deflected per month

TESTIMONIAL

“Mindsay allows us to facilitate our clients' journey by helping them 24/7 in finding answers when they don't have time to search the entire website.”

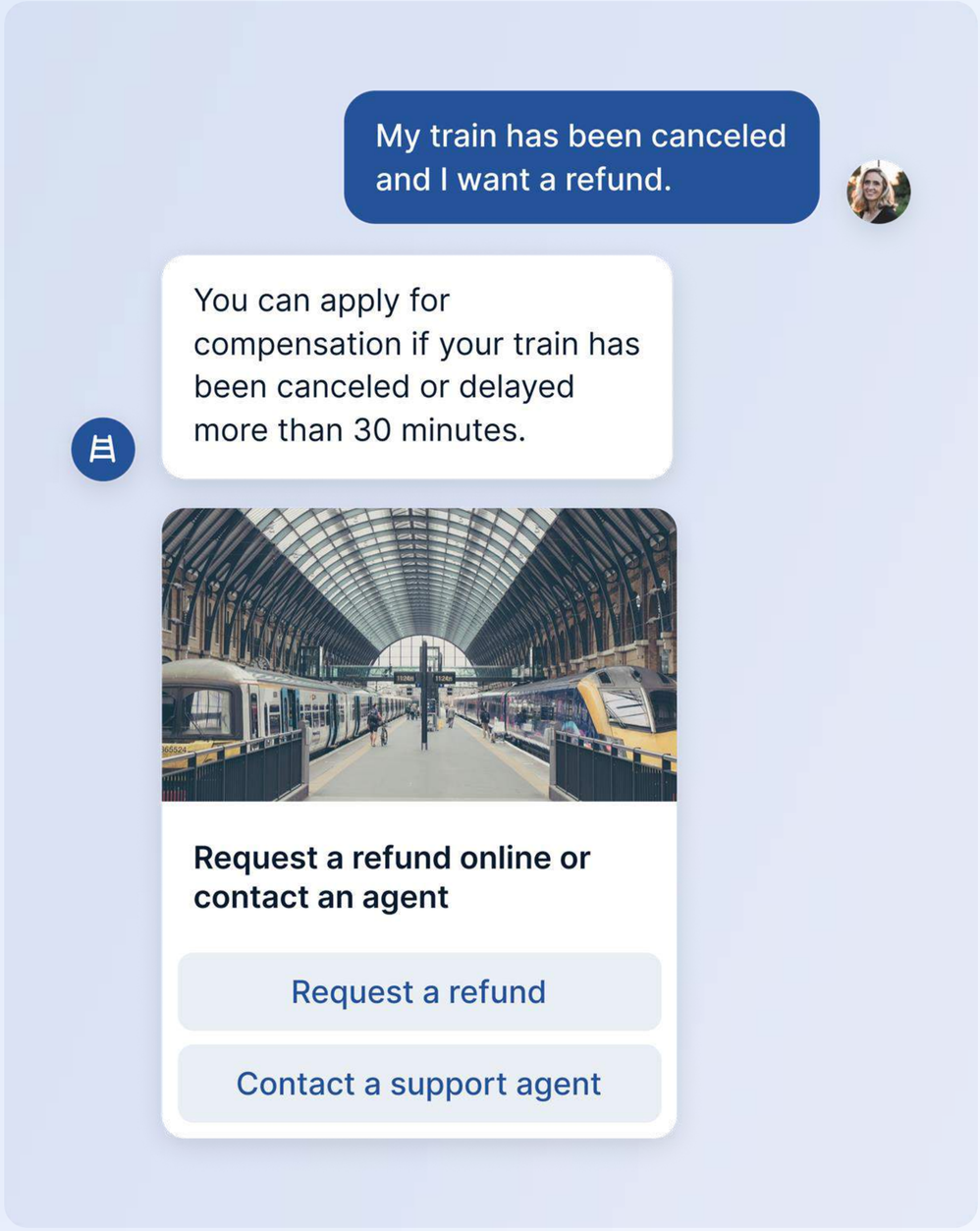
**Fanny Blandenet**, Web & Mobile Manager, TGV Lyria



PRODUCTIVITY USE CASES

# Cancelation & refunds

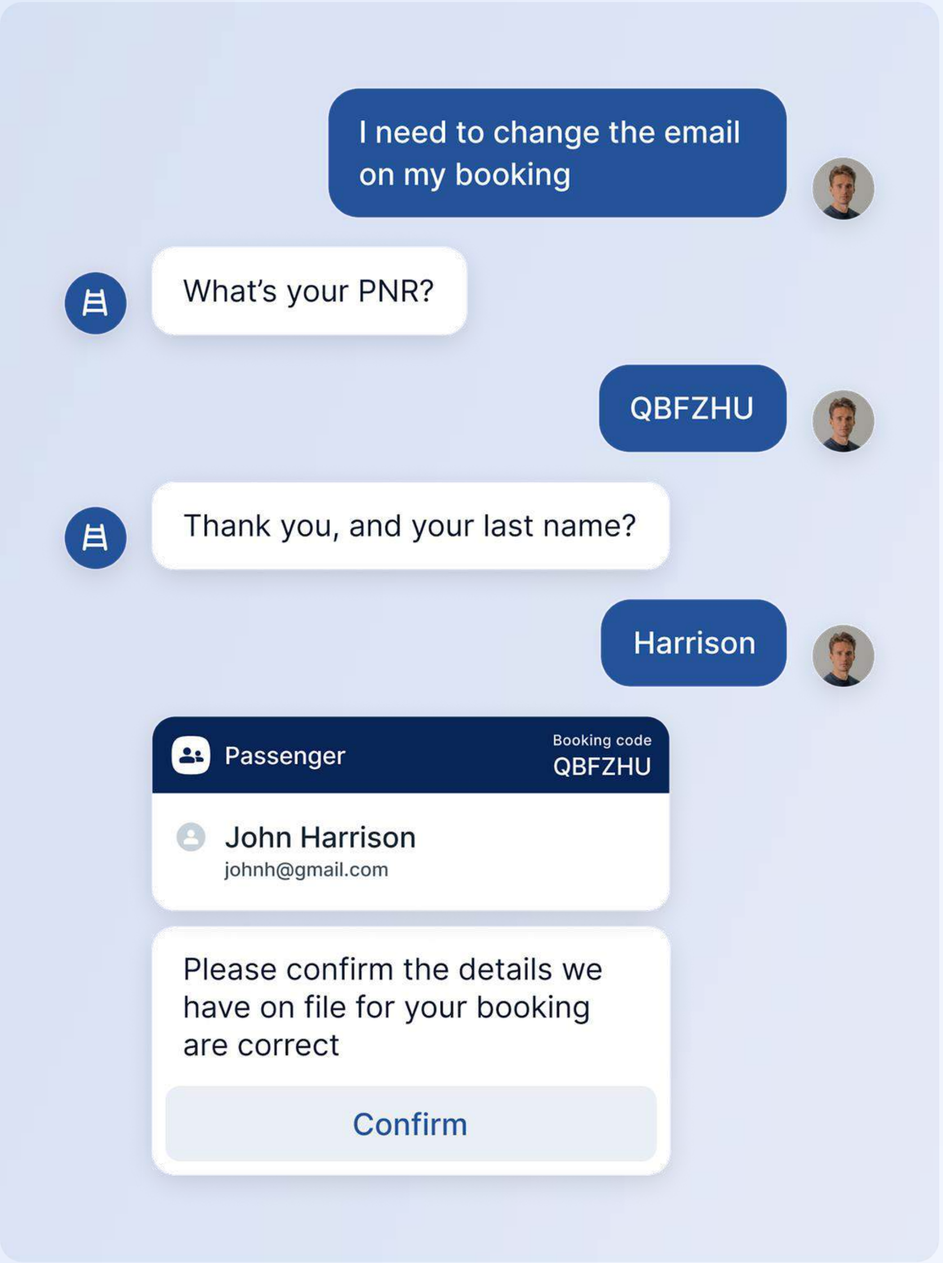
Offer travelers automated cancellation and refund options



PRODUCTIVITY USE CASES

# Change or add information

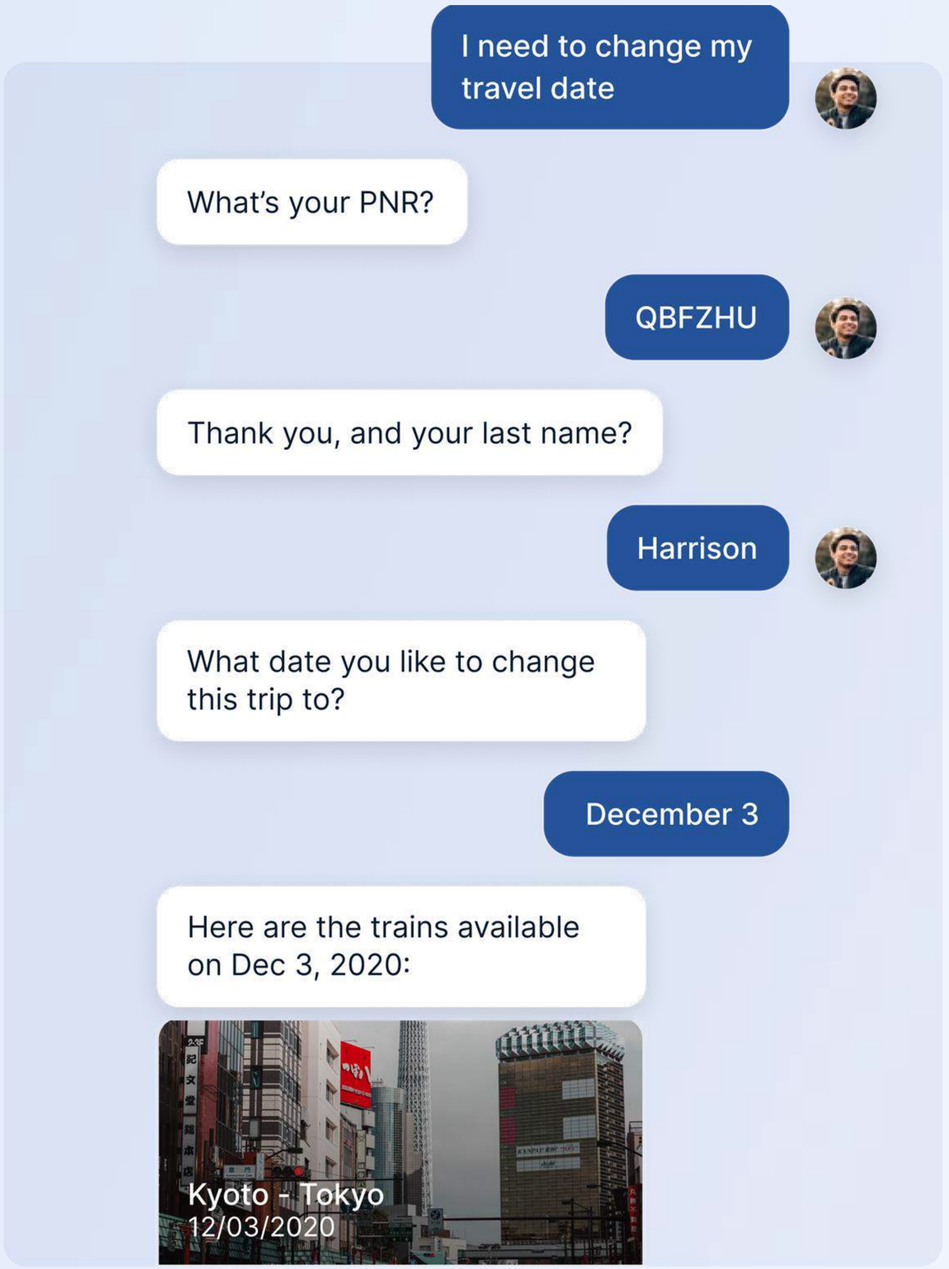
Change a passenger’s name, email, and other personal information using APIs.



PRODUCTIVITY USE CASES

# Ticket exchanges

Manage and process passengers’ ticket exchange directly from the bot.



PART 3

# How to Get Started with Mindsay

mindsay

# How to get started with Mindsay

- **Live in 8 weeks**
- **2 Experts needed from your Rail company**
- **Connected to your CRM**

| STEP 1 | STEP 2 | STEP 3 |
| --- | --- | --- |
| **Scoping** *(2 weeks)* | **Build & Train** *(4 weeks)* | **Test & Learn** *(2 weeks)* |
| Scope the use cases and processes you want to automate | Launch first bot quickly with basic use cases and learn from real data | Progressively add more complex use cases |

# Thank you!

Contact: sales@mindsay.com

mindsay

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## Conclusion

# WHEEL-RAIL INTERACTION MONITORING & DIAGNOSTIC SYSTEMS


*Introduced by*
Francesco MANNARA
IVM Co-Founder

IVM®

## Digital Railway Optimization on Wheel-Rail/Interaction

## IMPROVING SAFETY & ENABLING 4.0 PREDICTIVE MAINTENANCE

**IVM's mantra is to increase the frequency of the inspection measurements!**



Email: francesco.mannara@ivmtech.it | Website: ivmtech.it

# IVM – Wheel/Rail Interaction Systems

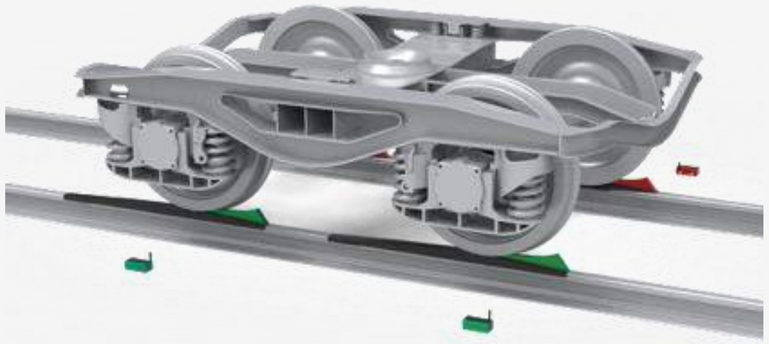
## WHEEL/RAIL INTERACTION MONITORING & DIAGNOSTIC SYSTEMS

### WEIGHT DISTRIBUTION

Static

*POWERVE*

Portable
Wheel Force Measuring System



### WHEEL CONDITION

Dynamic

*SWAN*

Smart Wayside Accelerometric Network

### WHEEL/RAIL EFFECTS

Dynamic

*OCTOPUS*

On Board Train
Wheel/Rail Interaction Monitoring

OCTOPUS





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# POWERVE - POrtable WEigher for Railway VEhicles

# POWERVE - POrtable WEigher for Railway VEhicles

## MEASURING THE VERTICAL FORCE DISTRIBUTION ON WHEELS AND WHEELSETS: FINALLY EASY, FAST, ANYTIME&EVERYWHERE!

- IT IS NOMORE NECESSARY TO MOVE THE ROLLING STOCK… **POWERVE** GOES TO THE ROLLING STOCK
- **POWERVE** IS EASY & FAST! IT MEASURES A ROLLING STOCK IN MINUTES
- **POWERVE** ALLOWS A MORE FREQUENT VERIFICATION OF THE BALANCE
- **POWERVE** COMPARES MULTIPLE MEASUREMENTS OVER THE TIME

EN 15654-2:2019 COMPLIANT

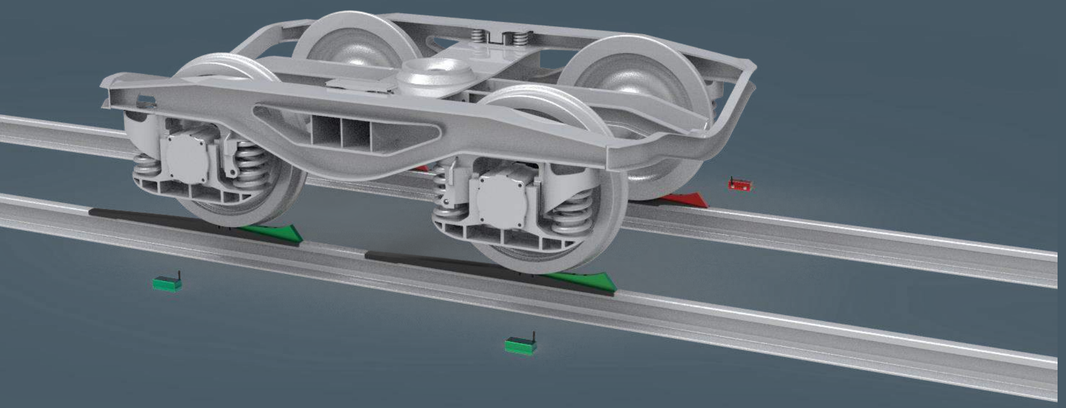
**POWERVE IMPROVES SAFETY & UNLOCKS PREDICTIVE MAINTENANCE APPROACHES**



IVM – Innovative Vibration Monitoring
Email: francesco.mannara@ivmtech.it | Website: ivmtech.it

# POWERVE

## **PO**rtable **WE**igher for **R**ailway **VE**hicles



Wheel Force Measurement System

## Patented & Certified

## European Recognitions

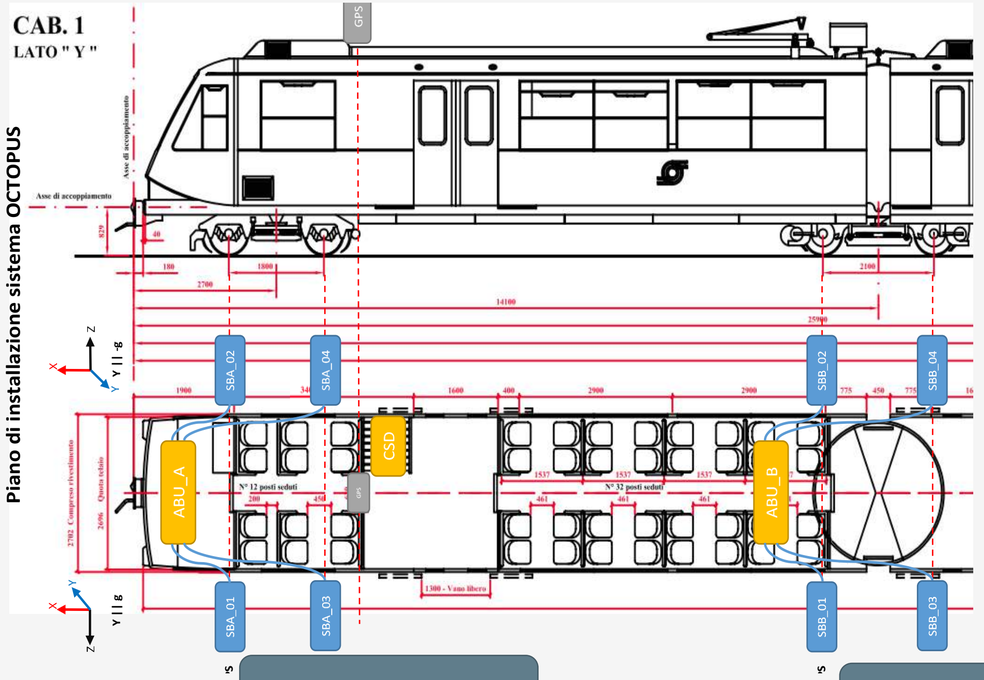
INNOVATION AWARD 2019
ERCI
EURAILCLUSTERS

H2020
SME INSTRUMENT
European Commission

DITECFER
EXPO Ferroviaria 2019
DITECFER Railway Innovation Leader 2019
POWERVE
IVM

UIC Digital Awards 2020
11 December 2020
ONLINE

# OCTOPUS – Wheel/Rail Interaction Diagnostic System

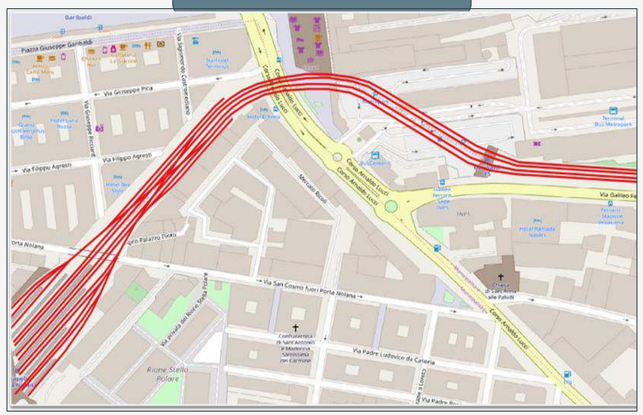



*Features of the Octopus system:*

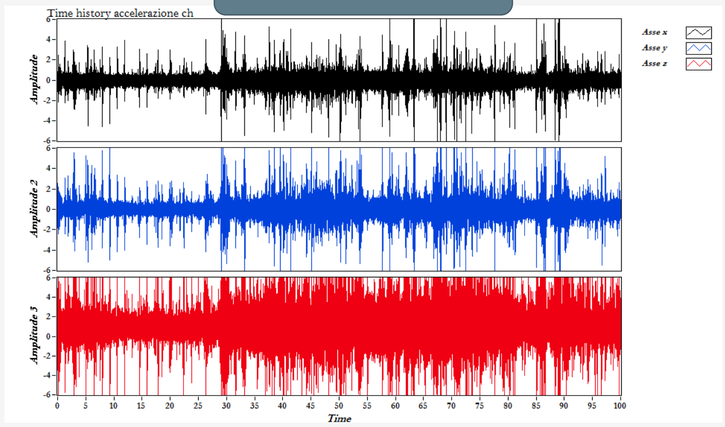
- *8 accelerometer sensors installed on the axle boxes of each bogie on the same platform.*
- *3 measurement directions (X, Y, Z), where X stands for the direction of travel, Y and Z stand respectively for the transverse direction and the perpendicular to the top of the rail.*
- *GNSS, information related to speed, coordinates, altitude.*
- *Automatic recordings when the train is powered on with remote transfer to the server.*

Measurement point

GNSS INFO



Accelerations



# OCTOPUS – Wheel/Rail Interaction Diagnostic System

- **OCTOPUS** increases the frequency of the inspection measurements since it can be **installed** on any in-service operating train.
- **OCTOPUS** doesn't need to **interface** with the on-board systems.
- **OCTOPUS** is able to **locate** any **POI** up to a centimeter accuracy.
- **OCTOPUS** is able to **compare** multiple runnings over the time.

**OCTOPUS IMPROVES SAFETY & UNLOCKS PREDICTIVE MAINTENANCE APPROACHES**





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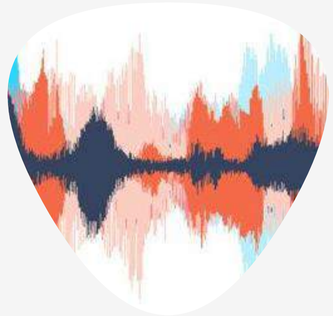
# OCTOPUS – Wheel/Rail Interaction Diagnostic System



## DATA COLLECTION

GET DATA YOU CAN TRUST

Advanced **measuring** system

## DATA TRANSFER

EFFICIENCY AND SECURITY

**Move the data** from on board to the processing Cloud

## DATA COMPARISON

IN SPACE AND TIME

Compare the data from different **Trains** and several **Transits**

# SWAN - Smart Wayside Accelerometric Network

The SWAN system was designed to acquire the accelerations transmitted at the wheel-rail interface, through which the quality of the contact surface of each passing wheel can be defined and evaluated: Wheel Quality Index, WQI.

Measurement components:

- 24 triaxial accelerometers based on MEMS technology (10+2 per rail);
- 2 inductive proximity sensors for detecting travel speed of the axles in the measurement area.



**SWAN** *MEMS based technology*

WQI

L0 L1 L2





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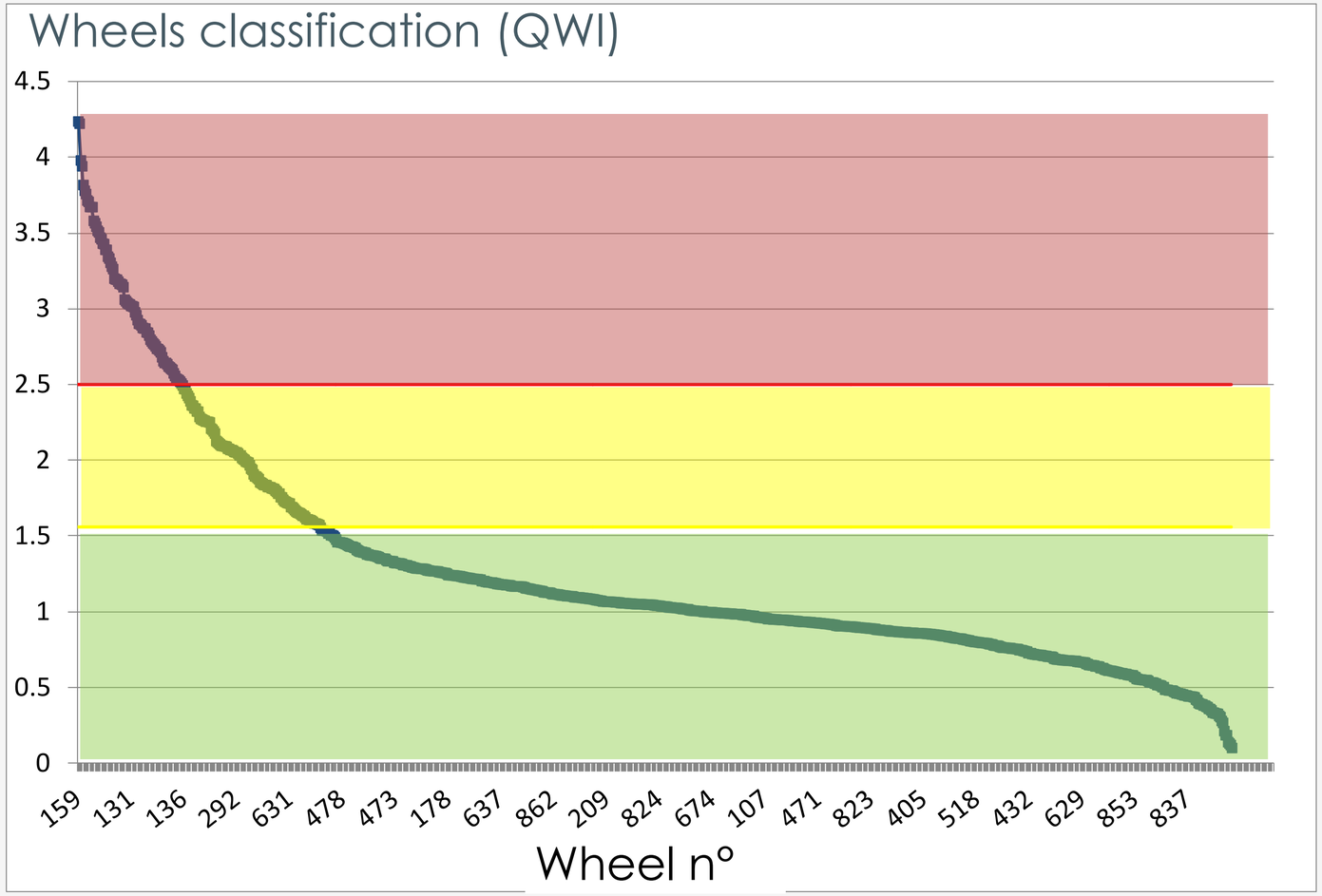
# SWAN - Smart Wayside Accelerometric Network

- Parameter used for the calculation of the QWI to the reference speed (25 km / h)
- Mean on the n passages validated
- Classification of the 896 wheels as a function of the parameter
- Threshold values that indicate the assignment of the level to the data set examined




**SWAN IMPROVES SAFETY & UNLOCKS PREDICTIVE MAINTENANCE APPROACHES**





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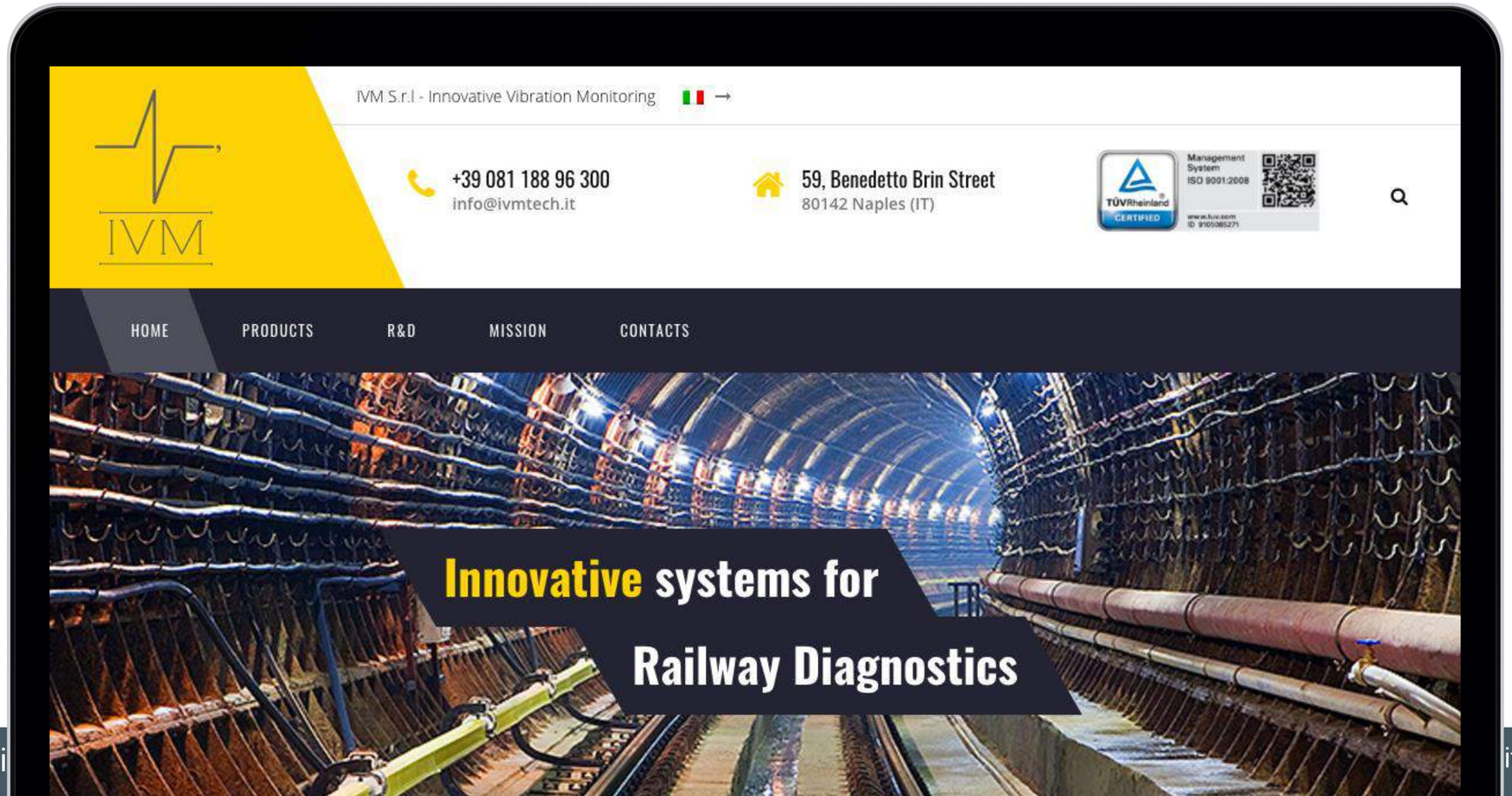
# IVM – Innovative Vibration Monitoring

Knowledge to Safety

## ivmtech.it



# Programme

Moderation by Simon Fletcher

## Introduction by UIC

**Introduction by François DAVENNE (UIC General Director)**
**Evgeny CHARKIN (RZD CIO and UIC Digital Platform Chairman)**

## Keynote Speakers

**Keynote by Jean-Michel MIS (Member of French Parliament and Member of National Digital Council)**
**Keynote AWS: Railway innovation through cloud computing by Cameron Brooks (Public Sector Director Sales Europe)**

## Presentations

**Presentation of ECOPMS project by Olivier MAUREL (CEO MCLEDGER)**
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**Introduction by Francis BEDEL**
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**UIC Digital Awards 2020 winner in the Services category: RailWatch GmbH & Co. KG- Presenter: Eike Westphal**

## Conclusion

SPEED SAFE SERVICE QUALITY

# Intelligent Marimo Analysis of Railway Accident Risk

Reporter: WangZhe

Beijing JingWei Information Technology Co., Ltd.

# Marimo

# 01 Background & Problem

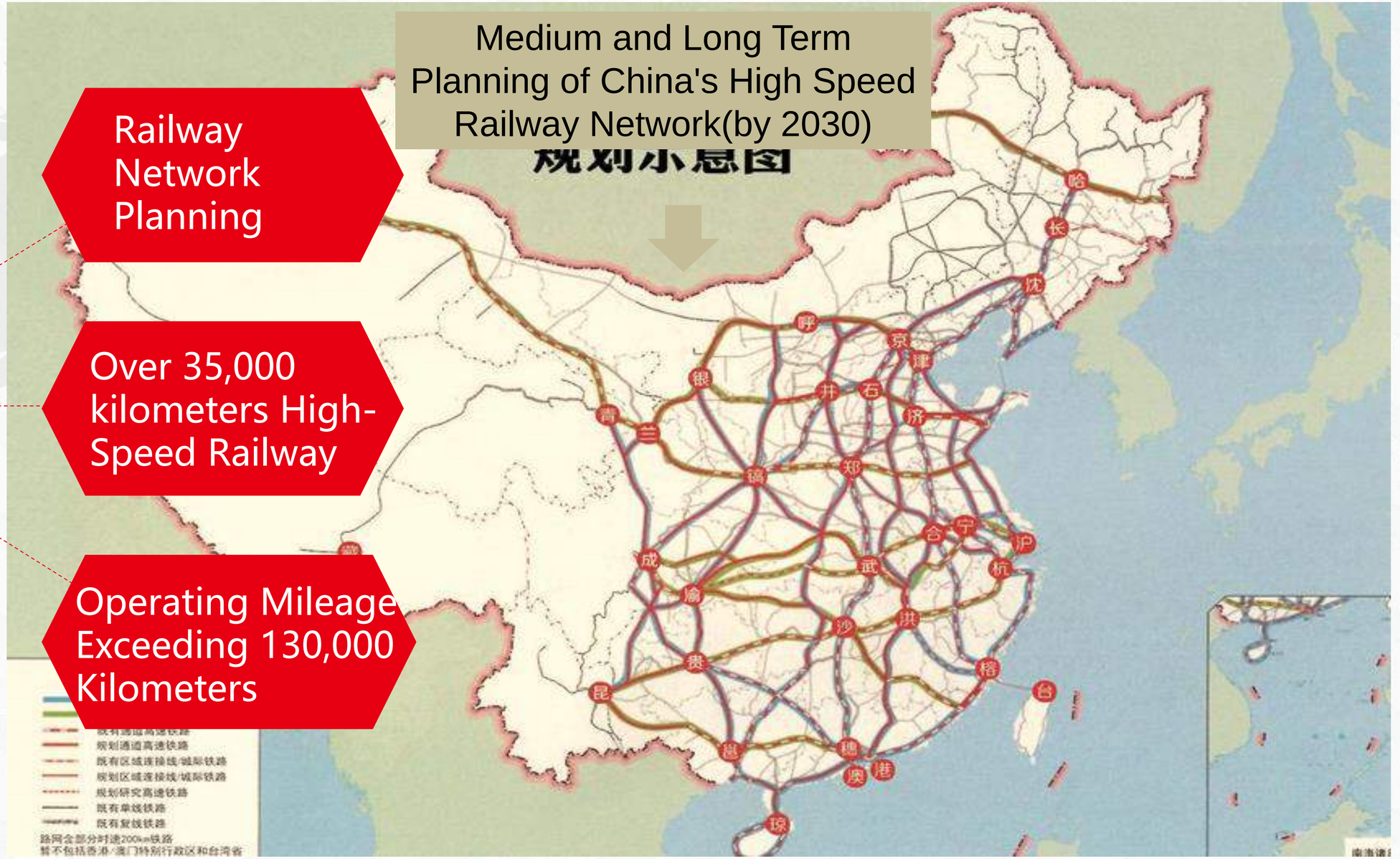
# China Railway Scale Expanding

Railway Development

Railway Network Planning

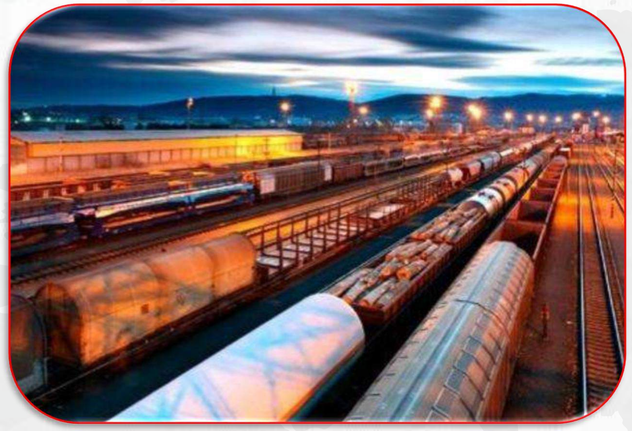
Over 35,000 kilometers High-Speed Railway

Operating Mileage Exceeding 130,000 Kilometers



# The Risks of Railway

## Huge Freight yard

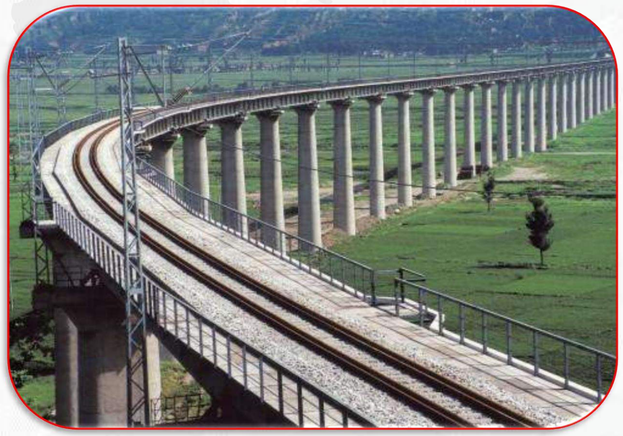


## Passenger Station

## High Speed EMU

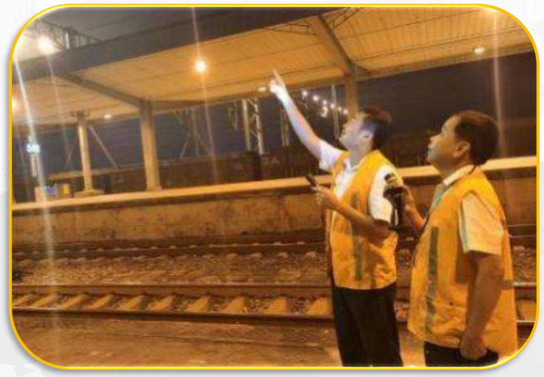
## OCS

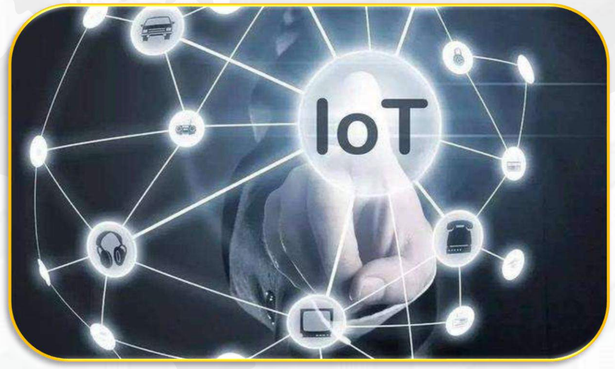
## Complex bridge



## Long tunnels

# Two basic ways to ensure safety






Technology

Lots of research

Management

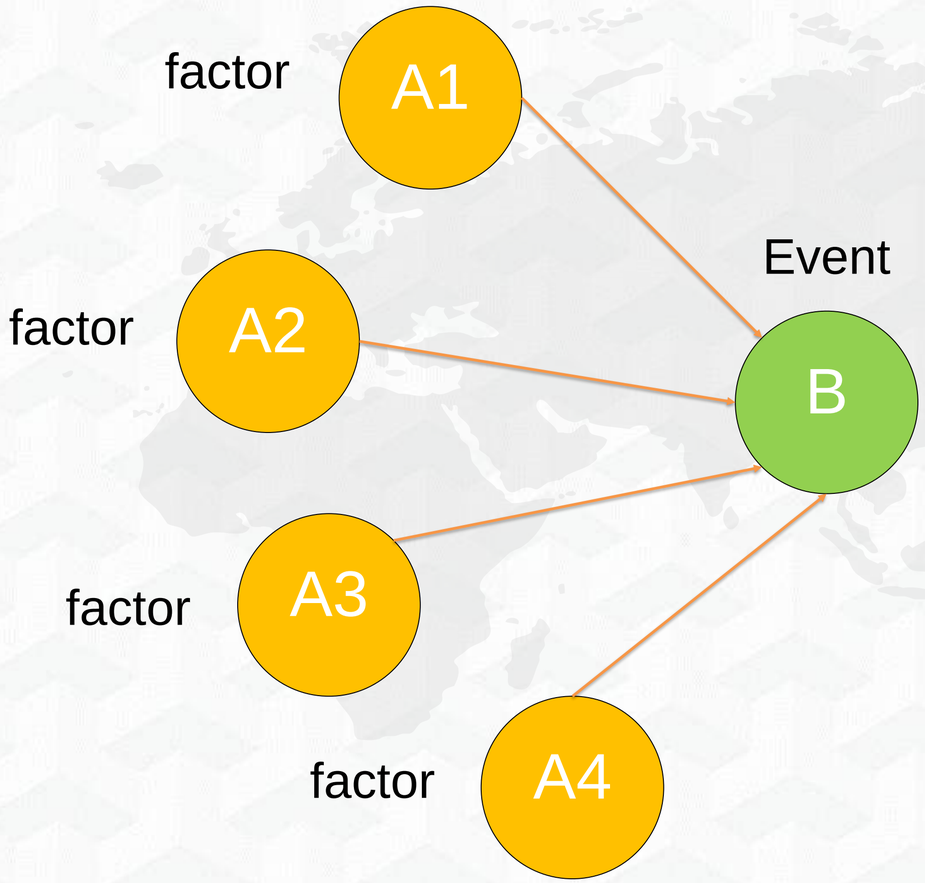
Data lack of use

# What we do

**Put forward the utilization of management data to analyze the railway accident risk.**

# 02 Accident Risks Analysis

# Basic concept



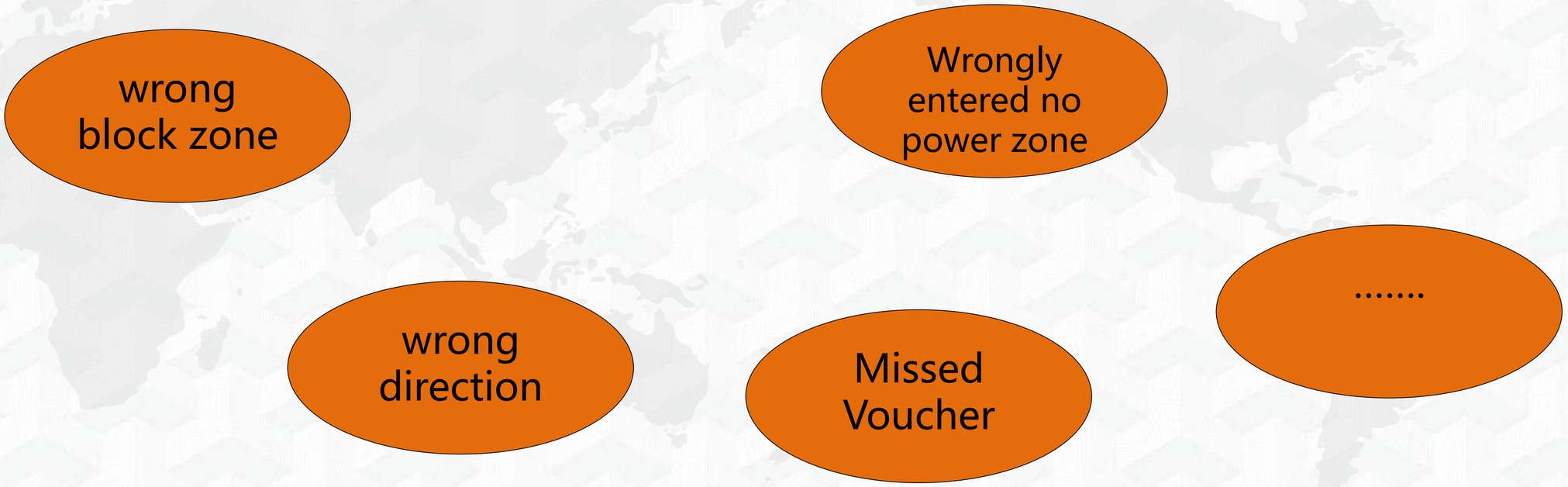

Factor A1,A2,A3,A4 are **necessary conditions** for event B.

To prevent B, we should make one of the factor (A1-A4) never happens.

Let’s start from here….

# Quick start for risk analysis

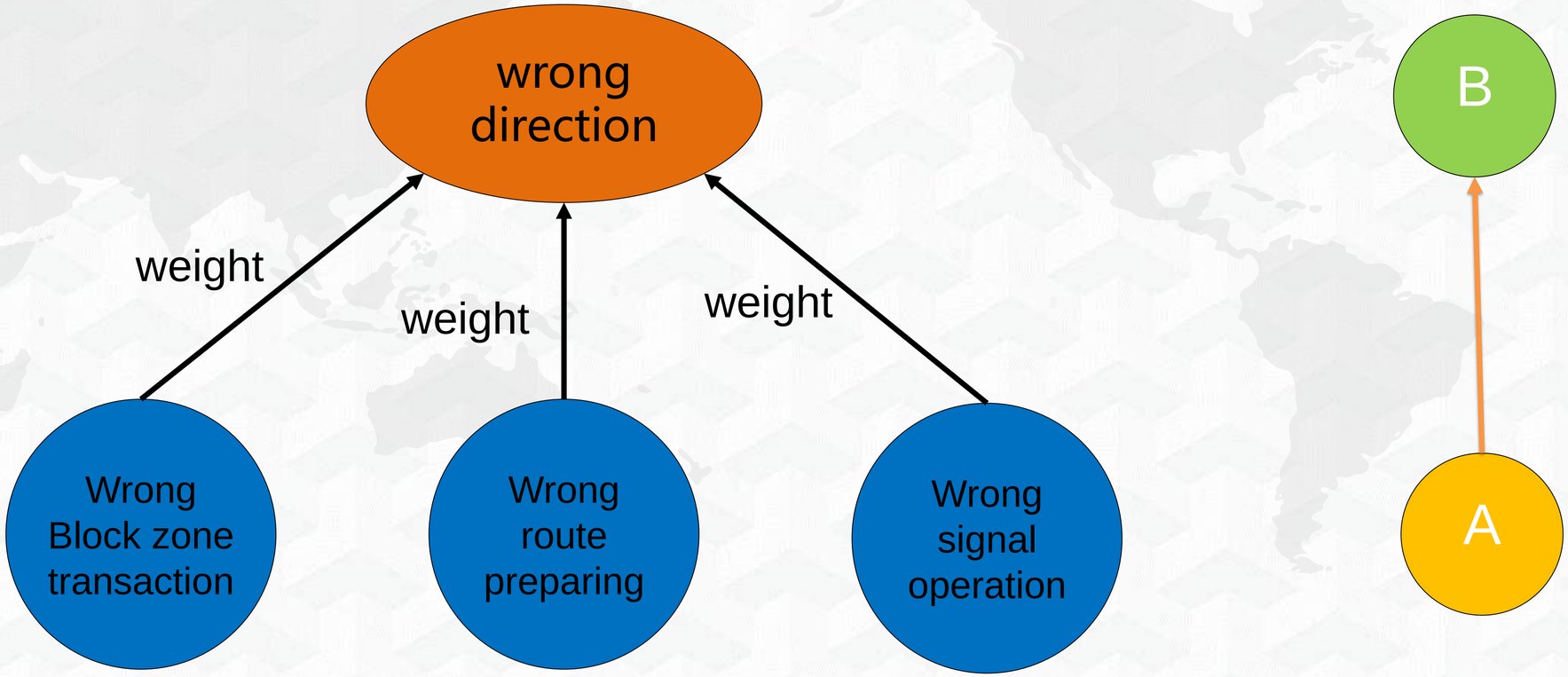
## Step 1: Identify the risks of an organization




Example : Risks of train reception and departure

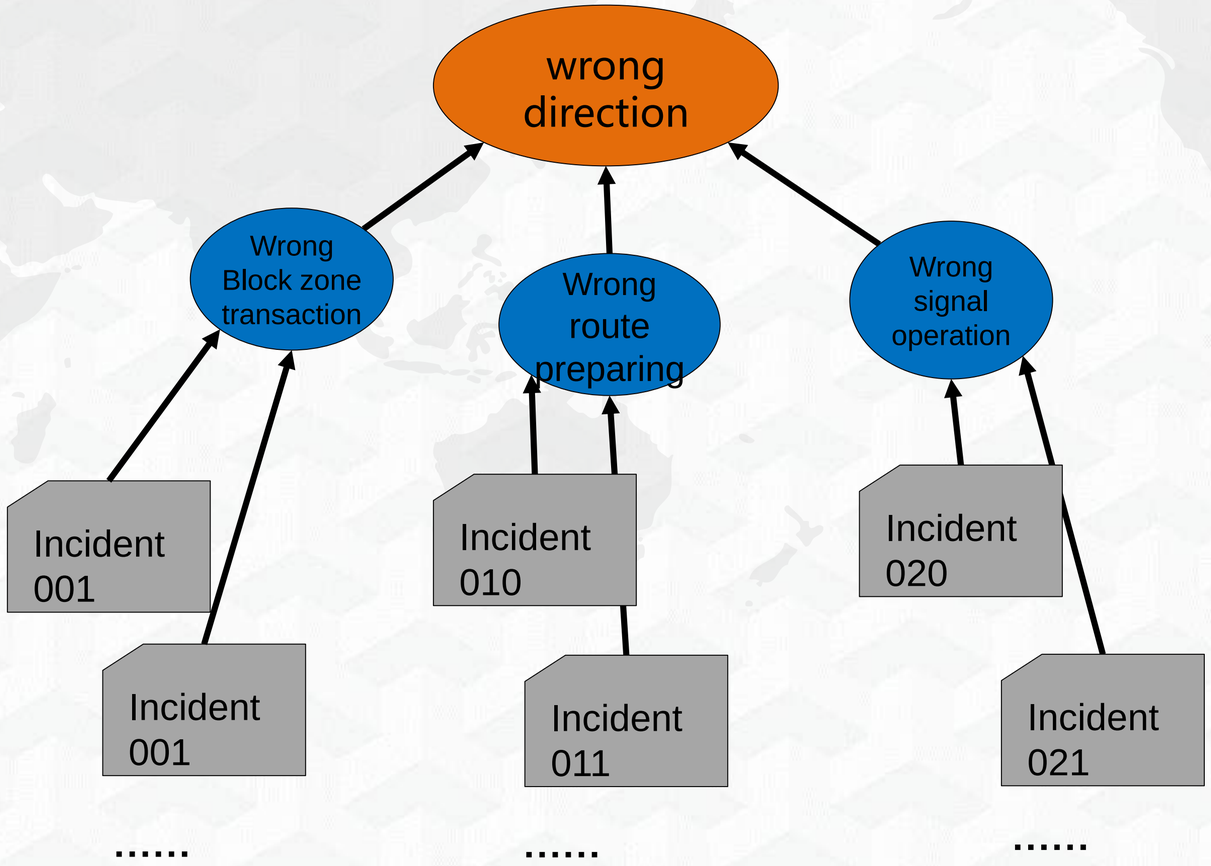
# Quick start for risk analysis

## Step 2: Identify the necessary conditions of each risk



# Quick start for risk analysis

## Step 3: Collect the past incidents related to the factors



# Step 3-1: Key points explanations

Incident
XXX

## What?

Wrong but not serious event, like mis-operation, duty officer leave without permission, missing items etc.

## How?

Revealed and recorded by daily management and inspection.

Management data

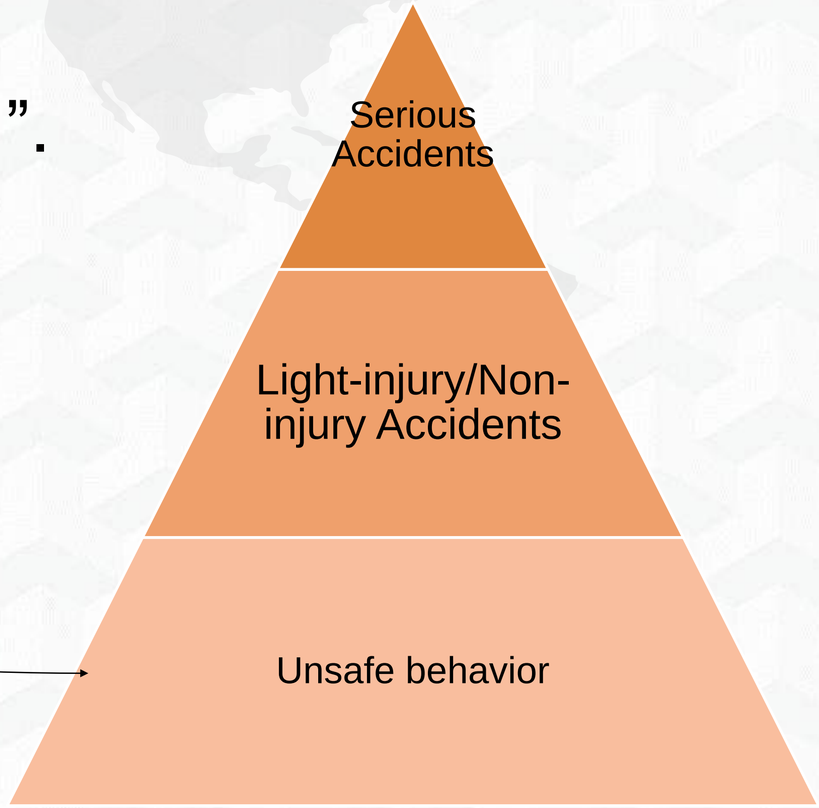
# Step 3-1: Key points explanations

Why?

Incident
XXX

The famous “300 : 29 : 1”.

**Heinrich's Law**



# Step 4: Handle the real data

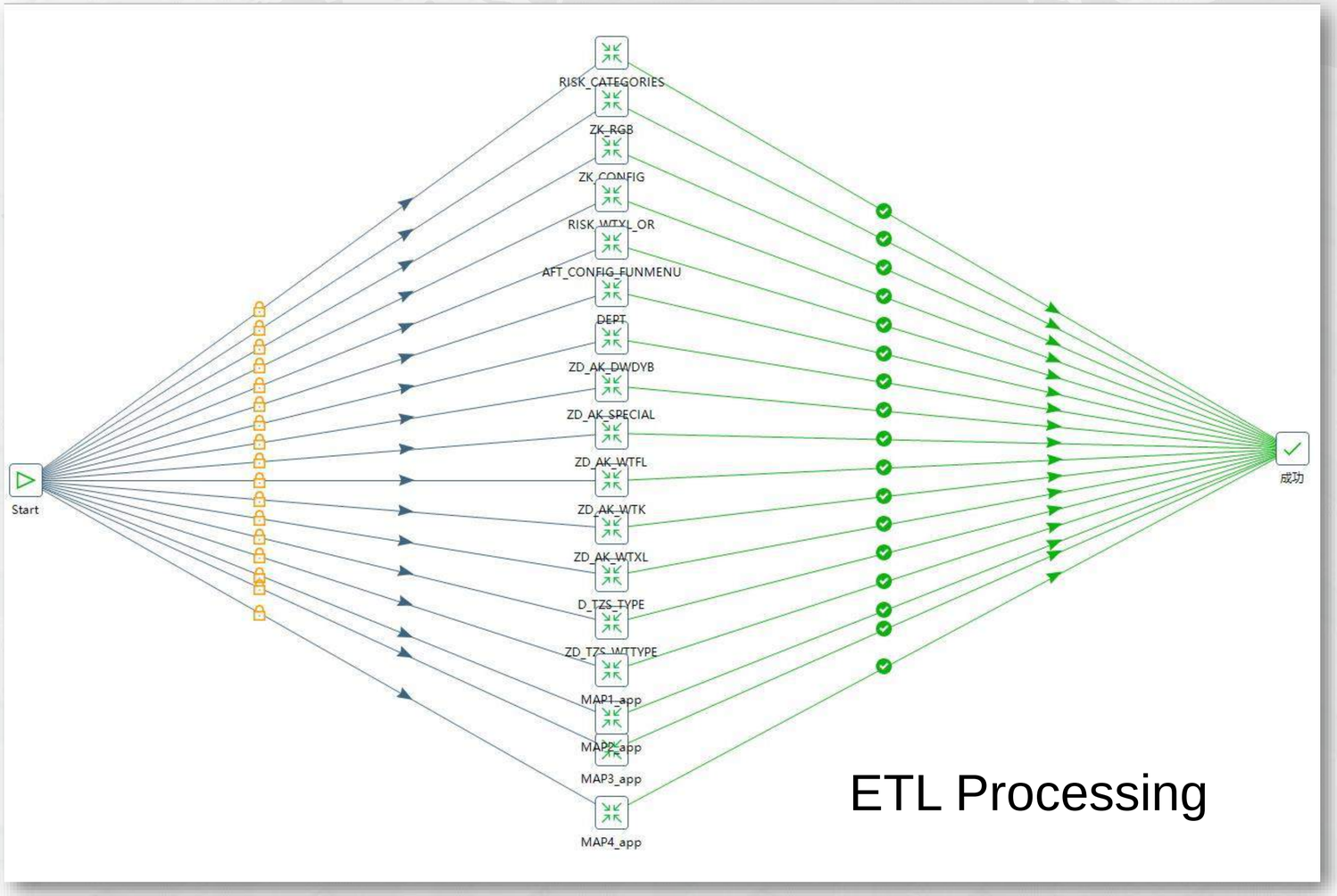
More than 20,000 safety supervisory and administrative personnel of the Railway Bureau record all harmless and medium-sized safety incidents discovered by on-site inspection through special mobile app.

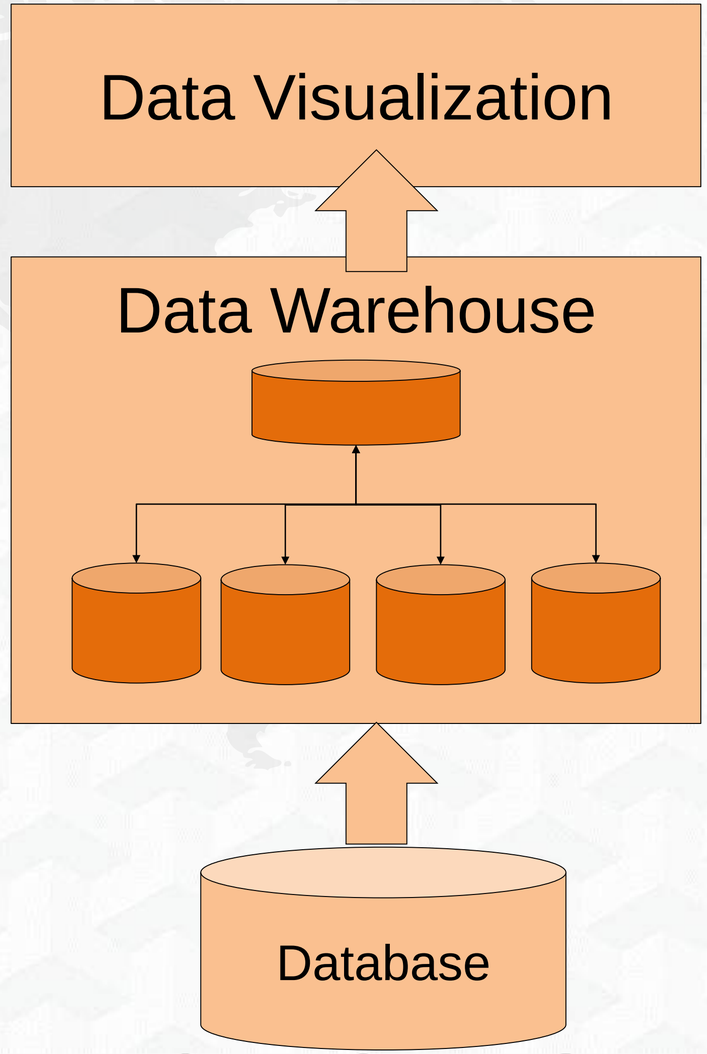
500,000*180=90,000,000

Within half a year, the number of data records is over 90 million.

# Quick start for risk analysis

## Step 5: We need data warehouse



# Step 6: Data mining

Risk assessment function:

$$H(I) = \sum_{i=1}^{n} w_i F(i) = \sum_{i=1}^{n} \sum_{j=1}^{m} w_i E(j) T(j)$$

Time Decay Function Model of Newton's Cooling Law:

$$\frac{dT(t)}{dT} = -k(T(t) - H)$$

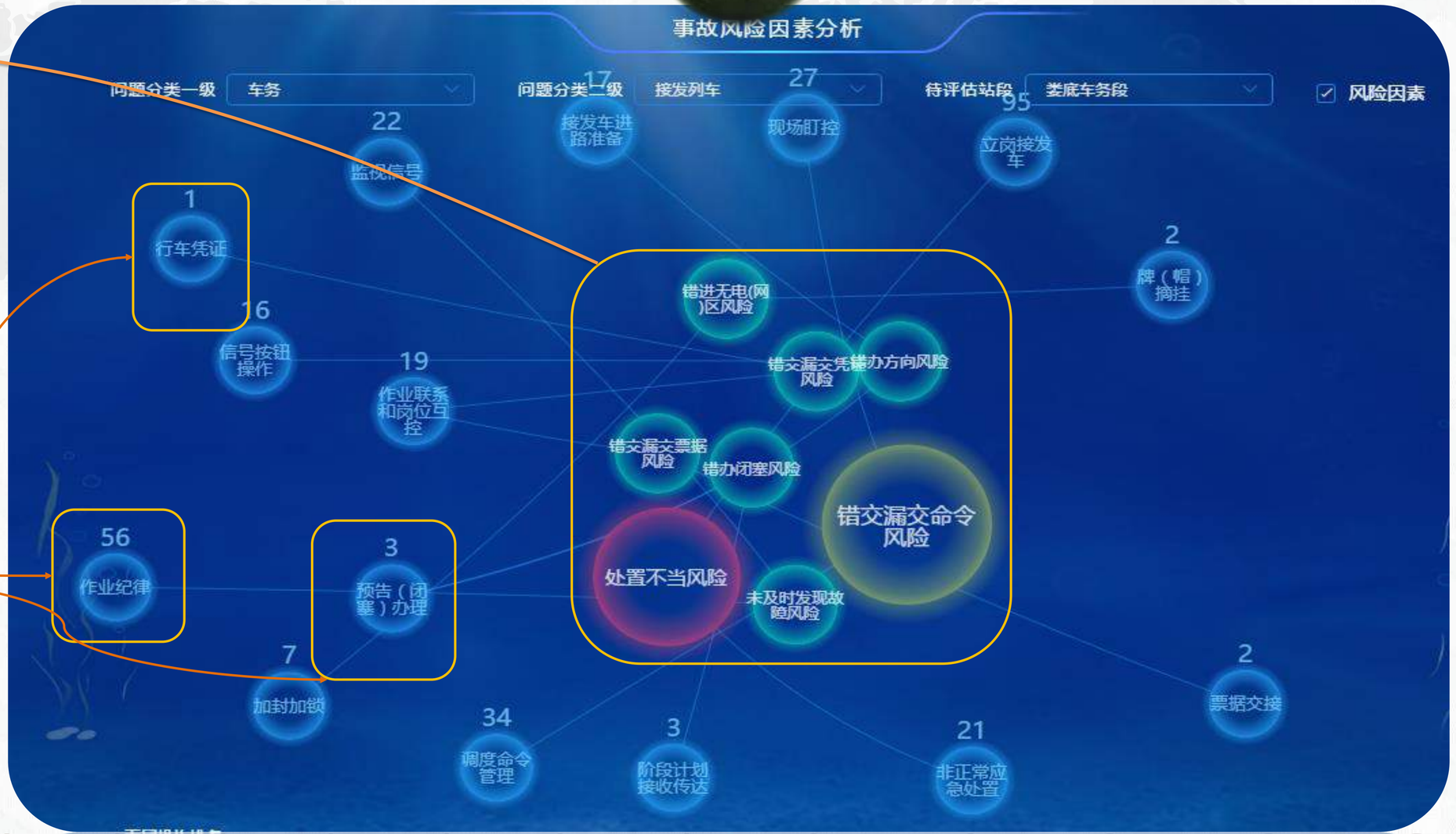
$$T(t) = T(t_0) \times e^{-k(t_0 - t)}$$

# Quick start for risk analysis

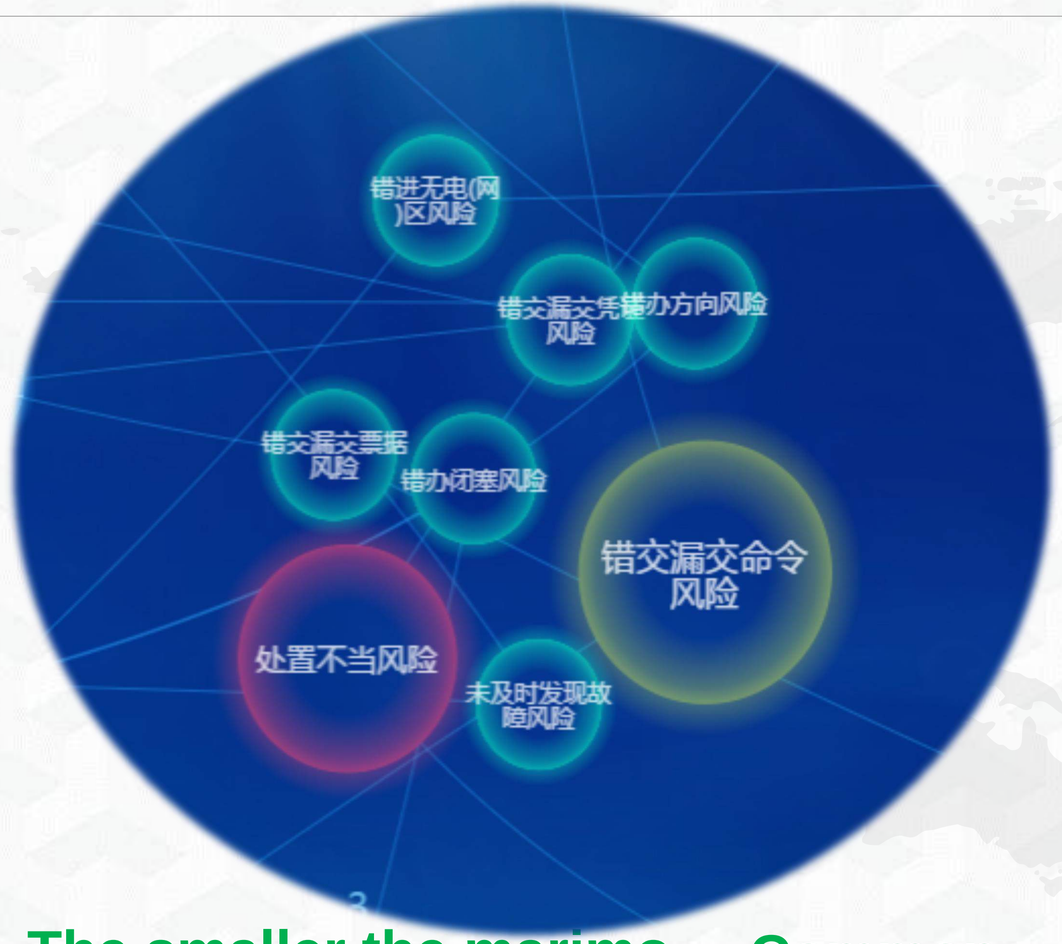
## Step 7: Data visualization

status of the risks.

risk factors

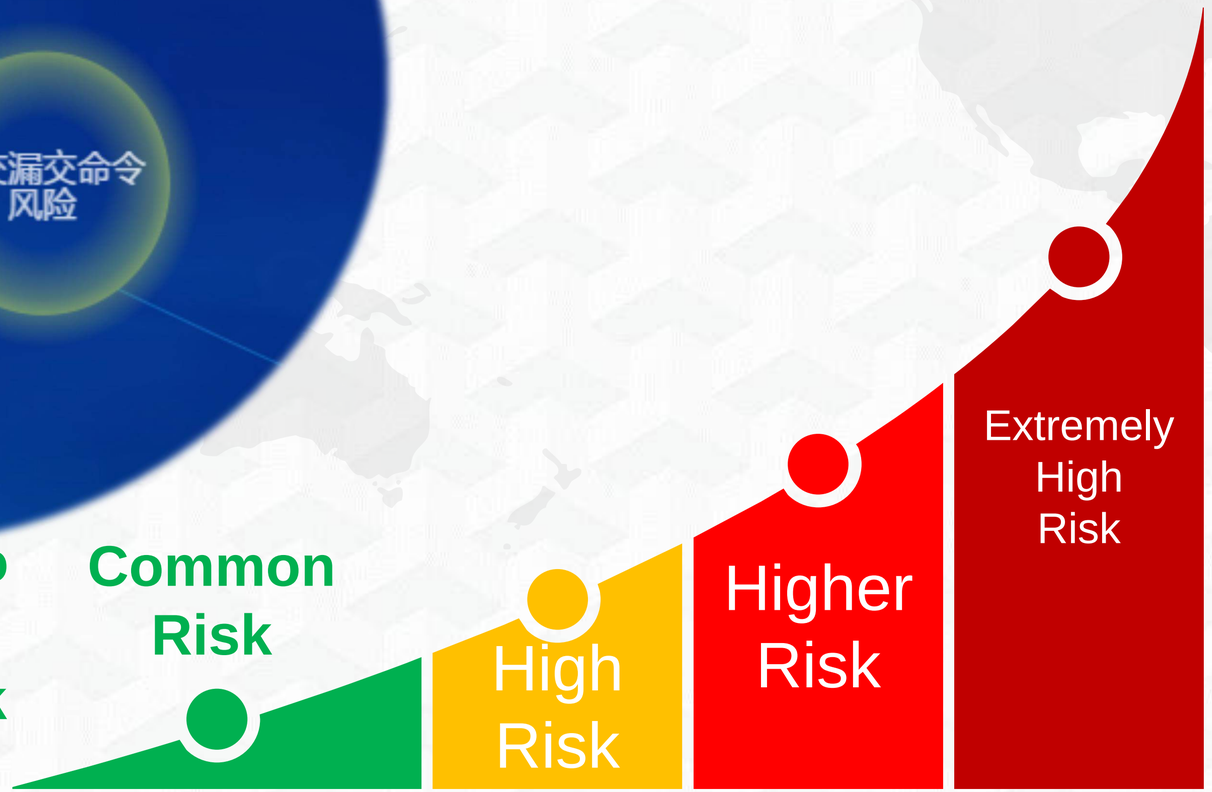


# Quick start for risk analysis




**The smaller the marimo and the greener the color, the lower the risk level.**

**The bigger the marimo and the redder the color, the higher the risk level.**



# 03 Application Effect

# Warning appears

There are 19 train management sections under a Railway Bureau’s Administration in southern China. Taking two types of accident-prone in train receiving and dispatching and shunting operation as examples within last one year：

**449 yellow marimo warnings appears**

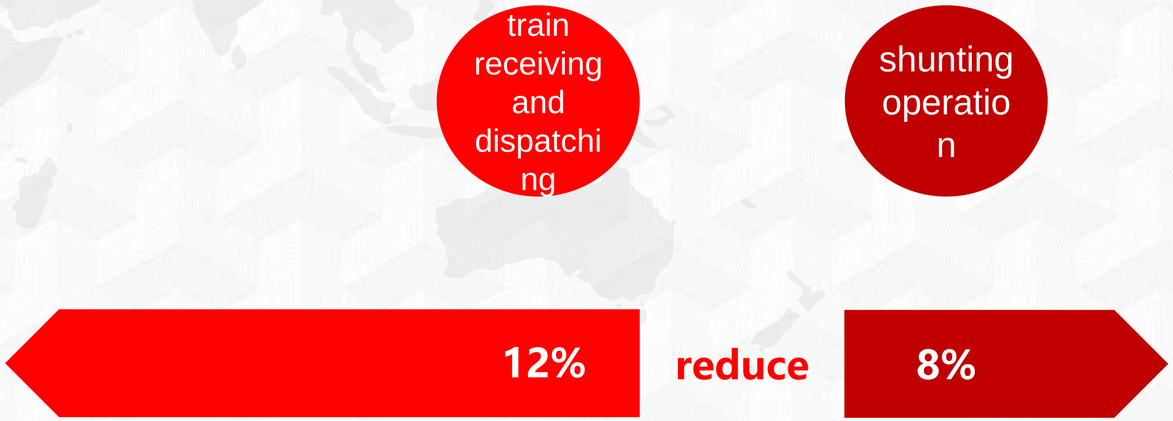
449

**65 red marimo warnings appears**

65

# Help decision making, reduce the probability of risks

According to the warning prompt, the relevant stations have strengthened the crux of management omission, improved the accuracy and efficiency of decision-making, and reduced the number of related accidents by 12% and 8% respectively compared with the same period in previous years.



THANKS FOR YOUR ATTENTION

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## Conclusion

RAILWATCH
Railway Monitoring System

# IF YOU DON'T KNOW ANYTHING, YOU MUST BELIEVE EVERYTHING.

RAILWATCH enables predictive maintenance in rail freight for the first time.

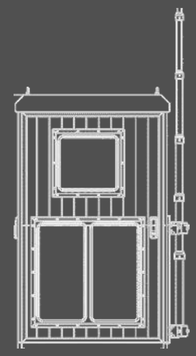
RAILWATCH
Railway Monitoring System

# WHO WE ARE

RAILWATCH
*is an IT company for rail freight transport located in Bonn.*

*25 motivated team members*
*2 founders*

*11 Locations in Germany*

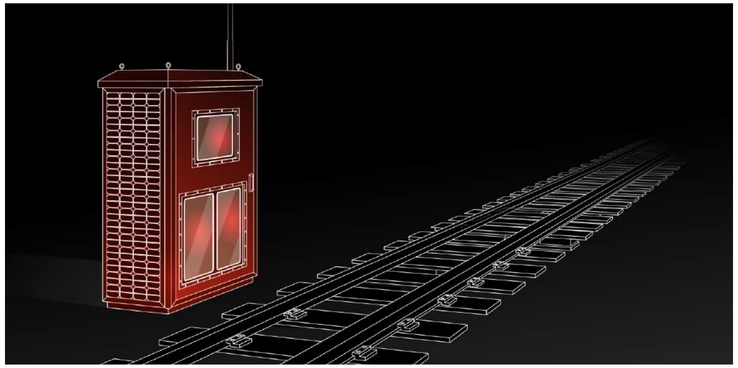


**100 %**

*We embrace our concept one hundred percent*

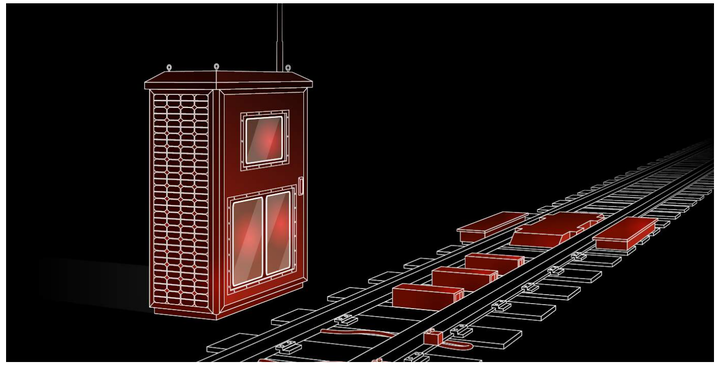
RAILWATCH
Railway Monitoring System

# OUR SYSTEMS



RAILWATCH Pulsar

*The mobile product:* A 4-square-meter plot of land next to the tracks, a power supply, a concrete base-plate, a forklift truck: this is all that is required to set up a RailWatch Pulsar measuring station within one working day. Then you will have access to full data about wagon identity, side views, brakes, wheel flats and noise levels. These measuring stations are suitable for installation next to mainline railways or in the entrance to industrial sites.



RAILWATCH Pulsar+

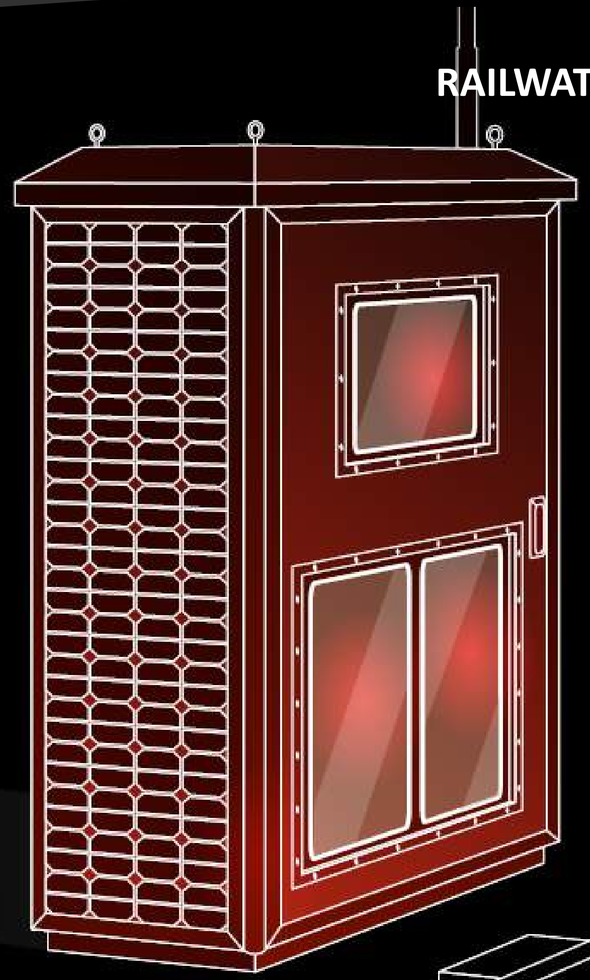
*The full-service model:* Ideal for installation in the entrance to important nodes, with the RailWatch Pulsar+ measuring station almost all important information about the technical condition of a freight wagon can be measured during a train passage. As well as the basic data about the identity of the wagon, comprehensive findings are recorded, including the condition of the wheels and the weight distribution.


RAILWATCH Orbit

*Our web portal:* Your complete data can be accessed here – from fleet level, to train level, right down to per-wagon level. Through repeat measurements, wear trends can be determined and the optimal time for maintenance thus calculated. Of course, damages requiring immediate intervention are also clearly shown.

RAILWATCH
Railway Monitoring System

# OUR SYSTEMS



**RAILWATCH** PULSAR

**WAGON RECOGNITION**
- Optical or RFID
- Wagon type and length, axle count, UIC number, direction of travel
- Graffiti, damages, thermal conditions
- Trailer number, container number, dangerous goods number.

**BRAKE BLOCK ANALYSIS**
- Brake block thickness (wear incl. recommendations, e.g. wedge-shaped wear)

**WHEEL FLAT DETECTION (acoustic)**

**NOISE MEASUREMENT**

**RAILWATCH** PULSAR+

**WHEEL SCAN**
- Flange thickness, height and slope
- Wheel diameter
- Wheel back-to-back measurement
- Tread hollowing
- Equivalent conicity
- Wear limit forecasting

**DYNAMIC WEIGHING**
- Wagon and axle weight measurement
- Weight distribution right / left

**WHEEL FLAT DETECTION**
- Measurement of the individual wheels
- Detection of out-of-roundness

RAILWATCH
Railway Monitoring System

RAILWATCH
Railway Monitoring System

# THE DATA –
# DIRECTLY FROM THE TRACKS TO THE ORBIT

RAILWATCH
Railway Monitoring System

RAILWATCH

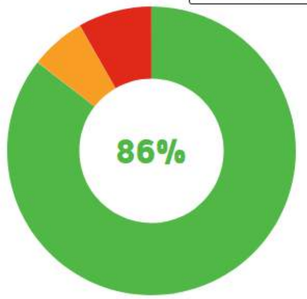
- Dashboard
- Fleetcheck
- Wagoncheck
- Traincheck
- Watchlist
- Blacklist
- Billings

DE | EN

## Fleet health check

Based on: last measurement, condition per wagons

last 30 days

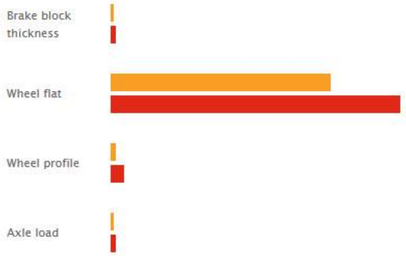



good warning critical

## Condition distribution

Based on: last measurement

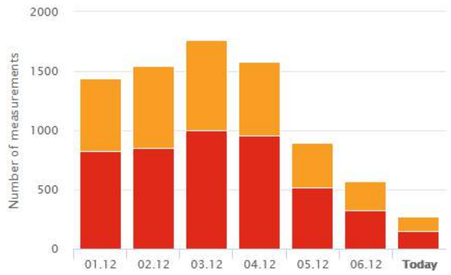
last 30 days




warning critical

## 7-day overview

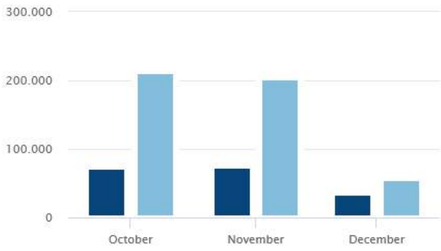
Measurements from the last 7 days




warning critical

## Wagons measured

Measurements from the last 3 months

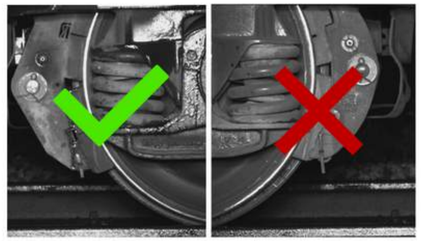



Wagons
Measurements

Wagons in 2020:
**192.304**

## Measuring stations


## News

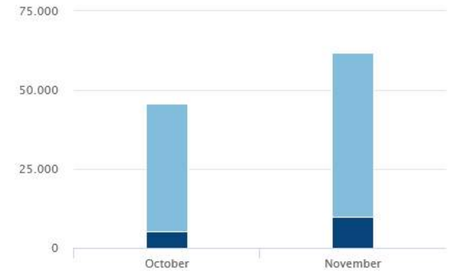


Now available: Brake block type recognition

As well as the roll-out of our measuring stations, our development of new features is also running at full speed. New feature: brake block type recognition. Best regards – Your RAILWATCH Team

## Billing overview

Billed wagons per month




up to 4 axles 6 or more axles

RAILWATCH

Dashboard
Fleetcheck
Wagoncheck
Traincheck
Watchlist
Blacklist
Billings

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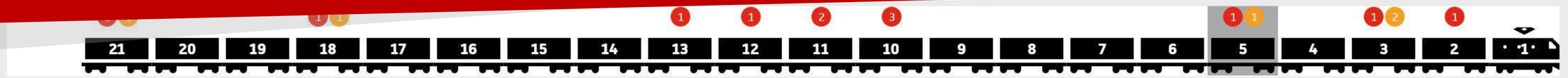
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 12/05/20 - 12/07/20 | | all | all | all | 1 - 50 | all | all |
| | 07.12.2020 13:03 | 91 80 6185 355-5 | RFC 9 - Passau 1 | - | Tank wagon | 19 | 1 1 | - |
| | 07.12.2020 12:49 | 91 85 4486 509-3 | RFC 1 - Rheintal 3 (rechts) | - | Intermodal | 14 | 1 | - |
| | 07.12.2020 12:27 | 91 80 6186 451-1 | RFC 1/8 - Aachen 1 | - | Bulk | 21 | | - |
| | 07.12.2020 12:20 | 91 80 6185 285-4 | RFC 9 - Passau 1 | - | Bulk | 43 | | - |
| | 07.12.2020 11:53 | 91 54 7386 033-5 | Port - Bremerhaven 1 | - | Intermodal | 26 | 1 | - |
| | 07.12.2020 11:39 | 91 80 6186 492-5 | RFC 1/8 - Aachen 1 | - | Tank wagon | 22 | | - |
| | 07.12.2020 11:36 | 91 80 6182 507-4 | RFC 1 - Rheintal 3 (rechts) | - | Bulk | 26 | 1 | - |
| | 07.12.2020 11:22 | 92 80 1209 006-6 | Industry - Wolfsburg 1 | - | Unknown | 15 | | - |
| | 07.12.2020 10:17 | 91 80 6189 023-5 | RFC 1 - Rheintal 3 (rechts) | - | Bulk | 21 | | - |
| | 07.12.2020 10:15 | 91 80 6192 009-9 | Port - Bremerhaven 1 | - | Automobile | 22 | 3 | - |
| | 07.12.2020 10:06 | 92 80 1209 006-6 | Industry - Wolfsburg 1 | - | Unknown | 7 | | - |
| | 07.12.2020 10:05 | 91 80 6186 183-0 | RFC 1 – Kaldenkirchen 1 | - | Mixed | 38 | 2 3 | - |
| | 07.12.2020 09:39 | 91 80 6193 882-8 | RFC 3 - Fulda 1 | - | Intermodal | 22 | 6 1 | - |
| | 07.12.2020 09:30 | 91 80 6189 034-2 | RFC 1 - Rheintal 3 (rechts) | - | Bulk | 21 | | - |
| | 07.12.2020 09:10 | 91 81 1293 195-4 | RFC 3 - Rosenheim 1 | - | Intermodal | 11 | | - |
| | 07.12.2020 08:57 | 91 80 6192 104-8 | Port - Bremerhaven 1 | - | Automobile | 23 | 3 1 | - |
| | 07.12.2020 08:40 | 91 87 0037 034-2 | RFC 7/8 - Braunschweig 1 | - | Mixed | 27 | 1 1 | - |
| | 07.12.2020 08:36 | 91 80 6186 137-6 | Port - Bremerhaven 1 | - | Intermodal | 25 | | - |
| | 07.12.2020 07:39 | 91 80 6193 608-7 | Port - Bremerhaven 1 | - | Intermodal | 26 | 3 3 | - |
| | 07.12.2020 07:35 | 91 80 6185 210-2 | RFC 3 - Fulda 1 | - | Automobile | 21 | 3 3 | - |
| | 07.12.2020 07:14 | 91 80 6189 062-3 | Port - Bremerhaven 1 | - | Intermodal | 24 | 1 | - |
| | 07.12.2020 07:05 | 92 80 1271 030-9 | Port - Bremerhaven 1 | - | Intermodal | 27 | 6 6 | - |
| | 07.12.2020 07:00 | 91 80 6193 217-7 | RFC 1 - Rheintal 2 (links) | - | Mixed | 24 | | GG |
| | 07.12.2020 06:44 | 91 80 6151 094-0 | RFC 7/8 - Braunschweig 1 | - | Bulk | 35 | | - |
| | 07.12.2020 06:41 | 91 80 6185 358-9 | RFC 9 - Passau 1 | - | Mixed | 24 | 2 | - |
| | 07.12.2020 06:22 | 92 80 1266 031-4 | RFC 1/8 - Aachen 1 | - | Intermodal | 22 | | - |
| | 07.12.2020 06:17 | 91 85 4482 001-5 | RFC 3 - Fulda 1 | - | Intermodal | 26 | 1 | - |

RAILWATCH
Railway Monitoring System

RAILWATCH



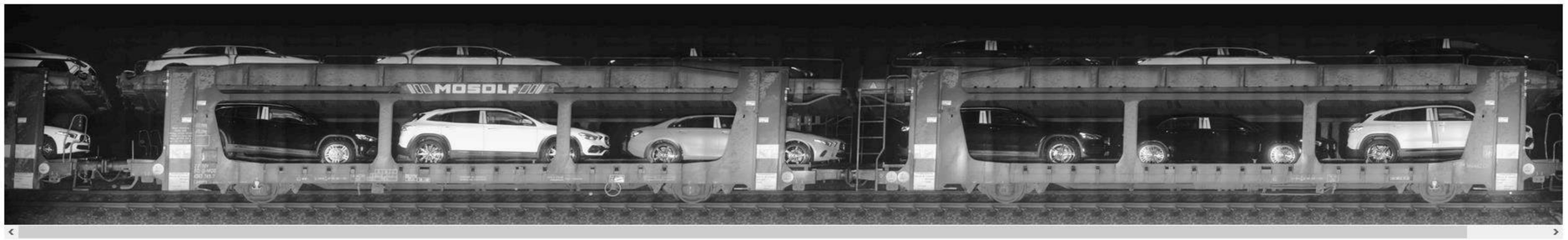



Download wagonlist

## 27 80 4363 749-7

Position of axles/wheels in direction of measurement

| | |
|---|---|
| Measurement time: | 06.12.2020 09:00 |
| Location: | Port - Bremerhaven 1 |
| Classification: | 4363 - Automobile |
| Brake block material: | K/LL |
| Wagon keeper according to GCU: | RailWatch GmbH & Co. KG |




| | 4L | 4R | 3L | 3R | 2L | 2R | 1L | 1R |
|---|---|---|---|---|---|---|---|---|
| **Wheel profile (mm)** | | | | | | | | |
| Flange thickness Sd | ● | ● | ● | ● | ● | ● | ● | ● |
| Flange height Sh | ● | ● | ● | ● | ● | ● | ● | ● |
| Flange slope (qR) | ● | ● | ● | ● | ● | ● | ● | ● |
| Tread hollowing $PH_{R0}$ | ● | ● | ● | ● | ● | ● | ● | 3.1 ● |
| Rim thickness | ● | ● | ● | ● | ● | ● | ● | ● |
| **left/right brake block** (mm) (Measurement accuracy without guarantee) | ○ ○ | ● ● | ○ ○ | ● ● | ○ ○ | ● ● | ○ ○ | ● ● |
| **Wheel flat** | | ● | | ● | | ● | | ● |
| **Axle load (t)** | | ● | | ● | | ● | | ● |

DE | EN

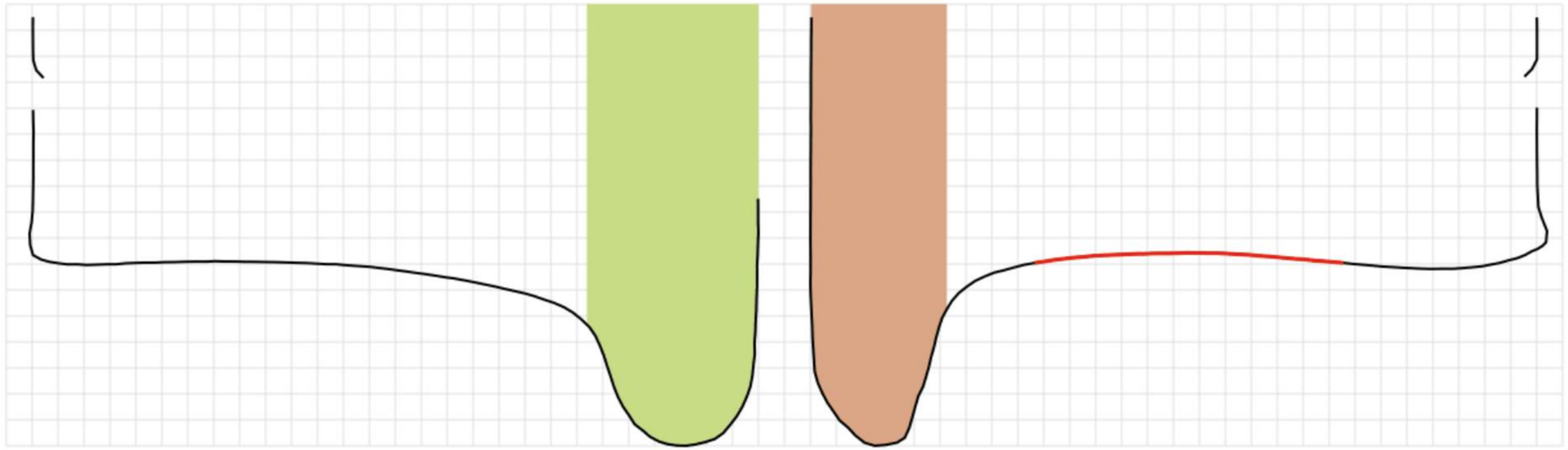
RAILWATCH
Railway Monitoring System

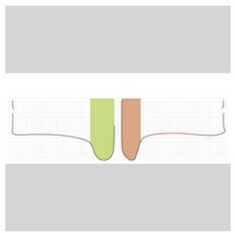
Dashboard
Fleetcheck
Wagoncheck
Traincheck
Watchlist
Blacklist
Billings

DE | EN

27 80 4363 749-7

Wheel profile of axle 1 in direction of measurement
Measured 06.12. 09:00 h





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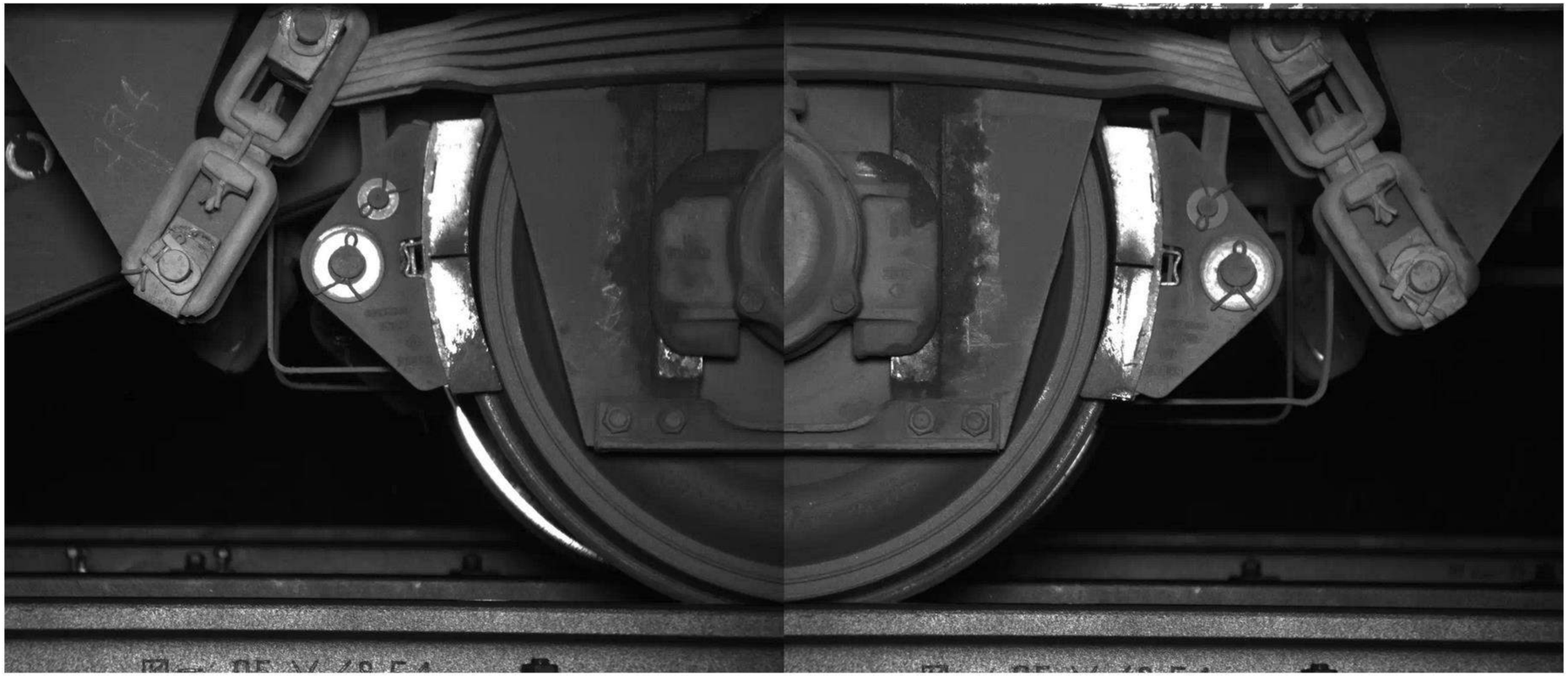
27 80 4363 749-7

Brake blocks of axle 3, right-hand side in direction of measurement
Measured 06.12. 09:00 h



Dashboard
Fleetcheck
Wagoncheck
Traincheck
Watchlist
Blacklist
Billings

DE | EN

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RAILWATCH

- Dashboard
- Fleetcheck
- Wagoncheck
- Traincheck
- Watchlist
- Blacklist
- Billings

DE | EN

06.12.2020 - Port - Bremerhaven 1

Add to watchlist | Exclude wagon from dashboard view

06.12.2020 - Port - Bremerhaven 1
03.12.2020 - RFC 1/8 - Aachen 1
01.12.2020 - RFC 1 - Rheintal 2 (links)
25.11.2020 - RFC 1/8 - Aachen 1
24.11.2020 - RFC 1 - Rheintal 2 (links)
22.11.2020 - Port - Bremerhaven 1

## Keeper (GCU)

| | |
|---|---|
| **Wagon no.** | 27 80 4363 749-7 |
| **Keeper** | RailWatch GmbH & Co. KG |
| **VKM** | RailWatch |
| **Telephone** | +49 (0)228 338 830 0 |
| **E-Mail** | info@rail-watch.com |

## WAGON HEALTH

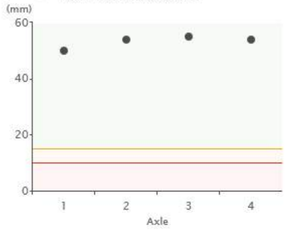
27 80 4363 749-7

Position of axles/wheels in direction of measurement

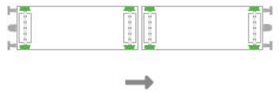
Axle 1
Axle 2
Axle 3
Axle 4

## Brake blocks

Brake block material: K/LL

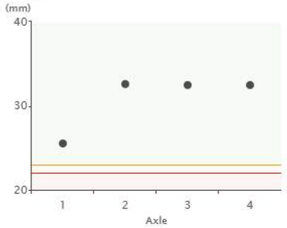



## Wheel flats

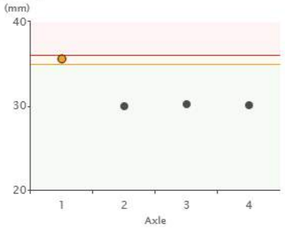


strong suspicion | suspicion
no suspicion | not evaluated

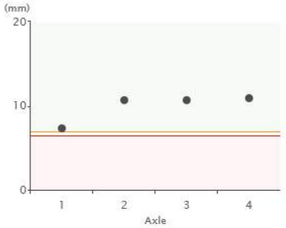
## Flange thickness



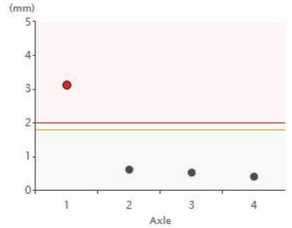

## Flange height



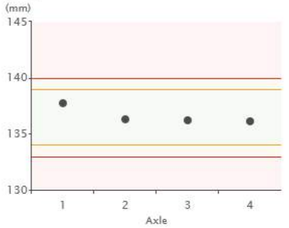

## Flange slope (qR)



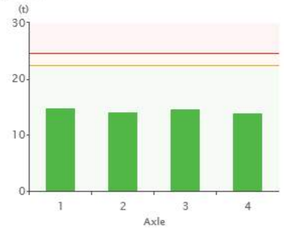

## Tread hollowing



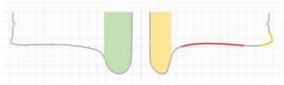

## Rim thickness




## Axle load




## Wheel profile



To show up the wheel profile pictures of all axles, click on the image above.

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# CUSTOMER GROUPS

## FREIGHT WAGON OWNERS

Freight wagons have no power supply and do not know a BUS system. Dumb steel objects!

Thus, their condition and the exact time of necessary service are unknown.

## RAILWAY UNDERTAKINGS

Each freight wagon must be inspected visually before train departure. Every day, 100,000 freight trains run in Europe.

Special training and manual effort are costly and time-consuming!

## INDUSTRY

Freight wagons are not inspected for damage before loading. If any damage is detected before the train departs, it must be unloaded or reloaded.

Thus, the loading and transport processes come to a standstill in a thousand industrial companies. Often the industrial product is lost.

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# OUR USP`s

## OWN HARDWARE

RailWatch "Pulsar" is a complete in-house development, including all the components.

## OWN SOFTWARE

In addition to the "RailWatch Orbit", the detection and evaluation software was created and developed in-house. Patent pending!

## REVOLUTIONARY LIGHT CONCEPT

Development of a completely new lighting concept in the red spectrum with unprecedented luminosity.

## TIME FACTOR SPEED

We are fast:
in the development of new components and their roll-out, as well as in the recognition of client needs, thanks to our team.

## VARIETY OF LOCATION

We are growing constantly:
not only in the number of stations, but also in the diversity of components.

## FINALLY, ALSO: THE PRICE

It is the cost-benefit ratio that decides for the clients.
With our flat rates, we are always attractive.

RAILWATCH
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# THANKS A LOT

## For further information, please contact me.


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Germany

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Mobil: +49 151 / 25 27 1573
Email: Eike.Westphal@rail-watch.com

# Programme

Moderation by Simon Fletcher

## Introduction by UIC

**Introduction by François DAVENNE (UIC General Director)**
**Evgeny CHARKIN (RZD CIO and UIC Digital Platform Chairman)**

## Keynote Speakers

**Keynote by Jean-Michel MIS (Member of French Parliament and Member of National Digital Council)**
**Keynote AWS: Railway innovation through cloud computing by Cameron Brooks (Public Sector Director Sales Europe)**

## Presentations

**Presentation of ECOPMS project by Olivier MAUREL (CEO MCLEDGER)**
**Presentation of BDTM project by Alexey OZEROV (Head of International Department JSC NIIAS)**
**Presentation of Project DIGIM II- Connected Level Crossing- UIC and Dassault Systems**

## The fifth UIC Digital Awards

**Introduction by Francis BEDEL**
**UIC Digital Awards 2020 winner in the Productivity category: Mindsay- Presenter: Guillaume Laporte**
**UIC Digital Awards 2020 winner in the Safety category: IVM srl- Presenter : Francesco Mannara**
**UIC Digital Awards 2020 winner in the Safety category: Beijing JingWei Information Technology Co., Ltd- Presenter: WangZhe**
**UIC Digital Awards 2020 winner in the Services category: RailWatch GmbH & Co. KG- Presenter: Eike Westphal**

## Conclusion


# Thank you for participating in the sixth UIC Digital Conference!

INTERNATIONAL UNION
OF RAILWAYS

## Stay in touch with UIC:

www.uic.org


#UICrail

**Thank you for your attention.**