



**RAILWAY
SYSTEMS**
by voestalpine

Digital Performance on Track®

From the world market
leader for the rail track

voestalpine Railway Systems
www.voestalpine.com/railway-systems

voestalpine

ONE STEP AHEAD.

DATA INTEGRATION CASE STUDY

HIGH SPEED ONE, UNITED KINGDOM



Stratford International

St Pancras

Ebbsfleet International

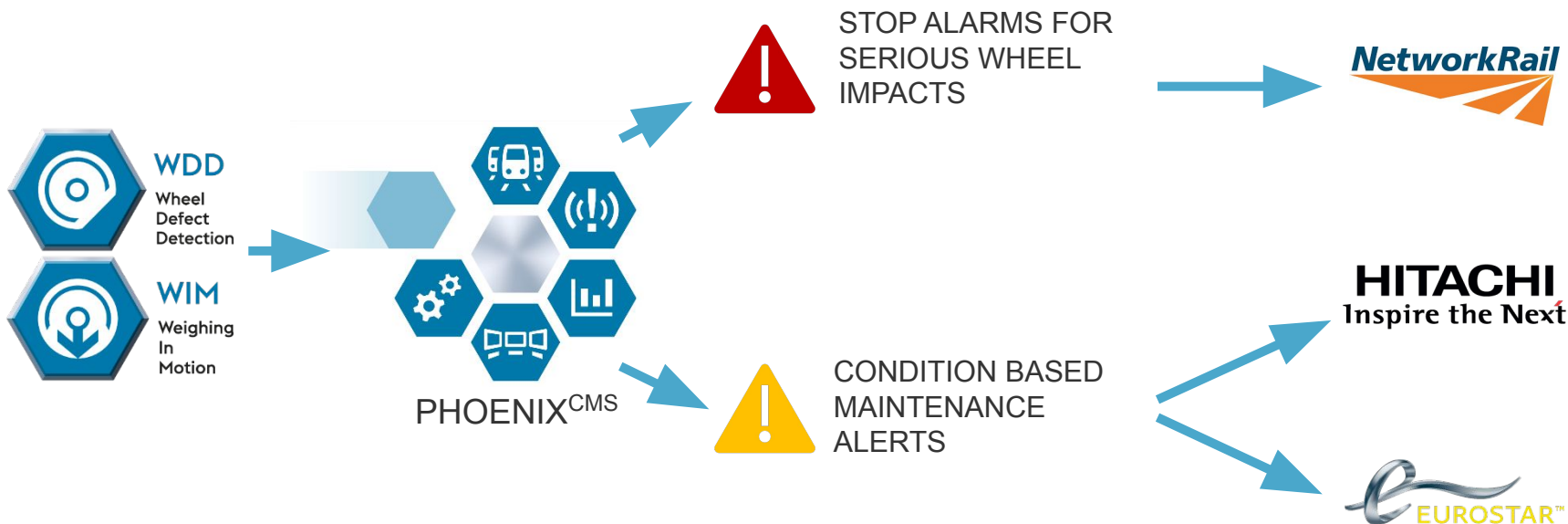
LONDON

HS1

Ashford International

Channel Tunnel

Network Rail HS1 Use Case



Process Change: Acting on Data



voestalpine Railway Systems

Process Change: Acting on Data



Process Change: Acting on Data



Image: Getty

NEWS

POLITICS

FOOTBALL

CELEBS

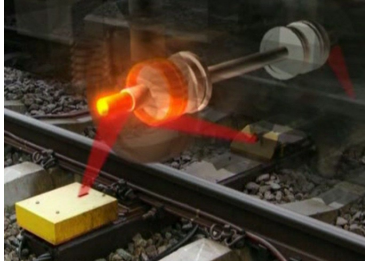
TV

MONEY

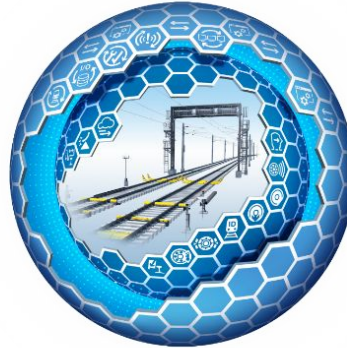
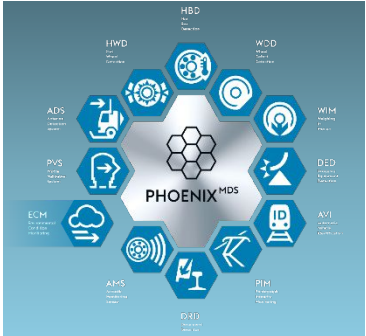
ROYALS

**More than 800,000 British motorists
break down every year – because their
vehicle runs out of fuel**

Evolution of Monitoring Needs



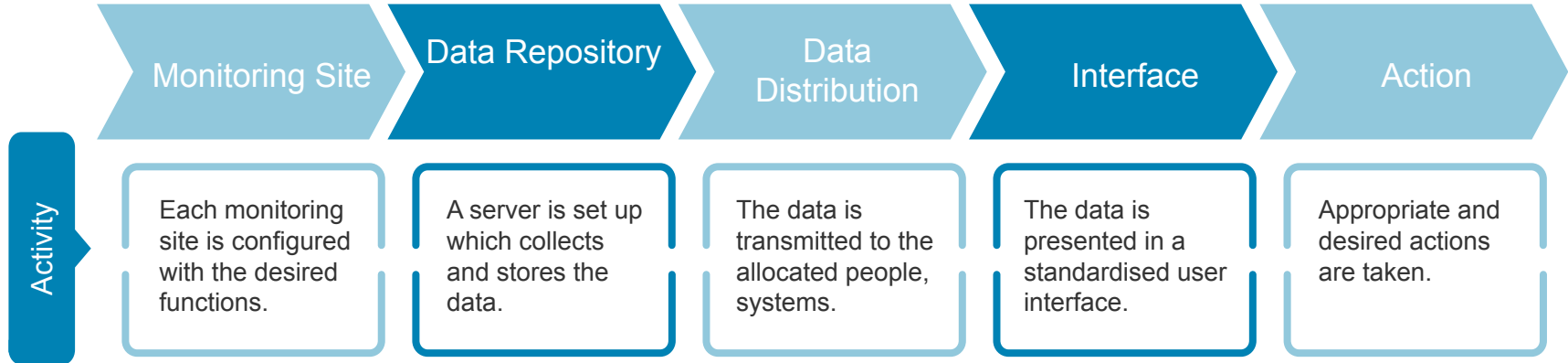
HABD1 (left)		HABD2 (right)	
Min/Max/Avg	18.8 146.4 17.7	Min/Max/Avg	16.8 33.8 21.9
35 cm, 17.3 °C	1	23.8 °C, 35 cm	
34 cm, 18.1 °C	2	23.2 °C, 34 cm	
33 cm, 146.4 °C	3	23.9 °C, 33 cm	
33 cm, 16.9 °C	4	23.1 °C, 33 cm	



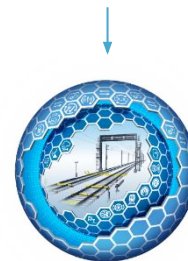
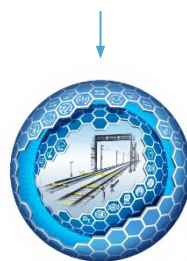
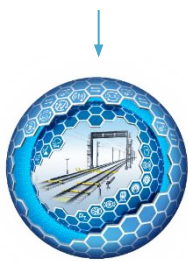
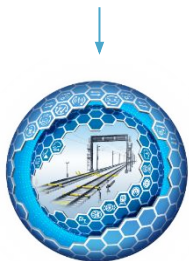
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ONE STEP AHEAD.

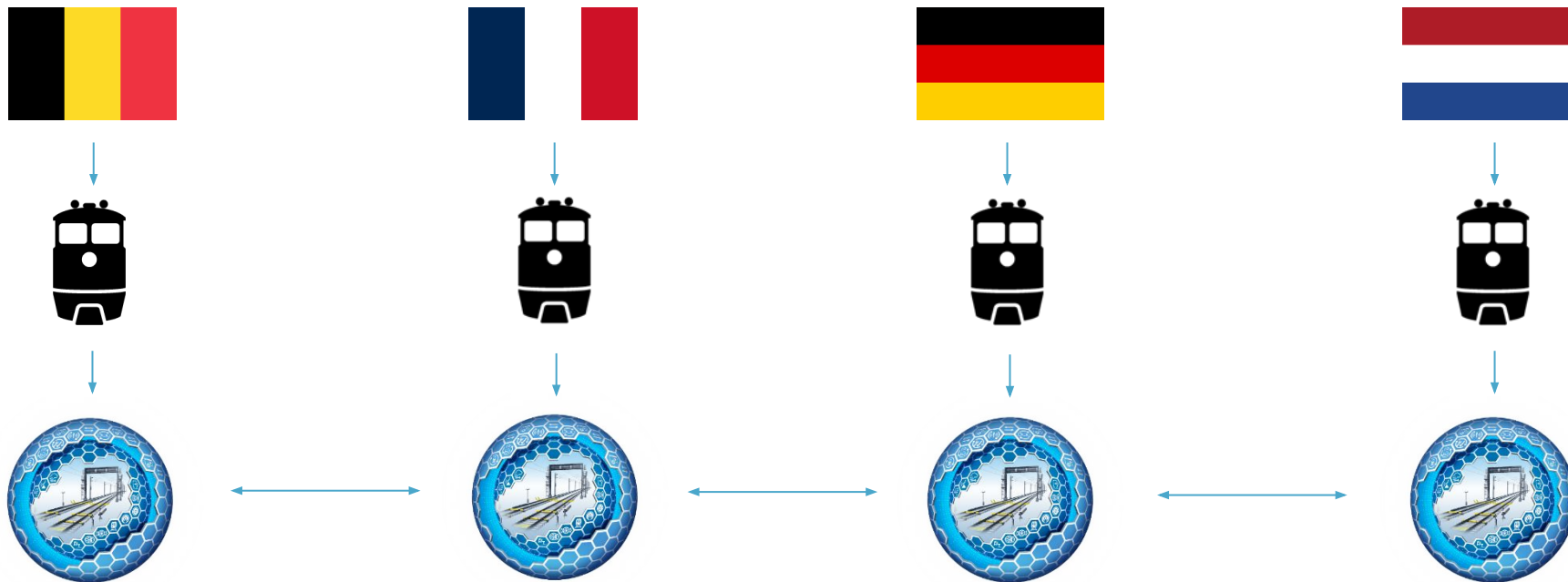
Mapping The Data “Storyline”



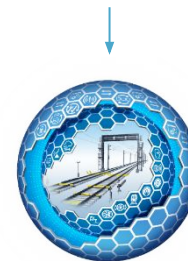
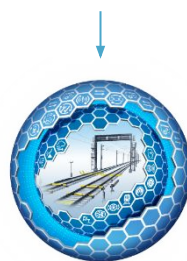
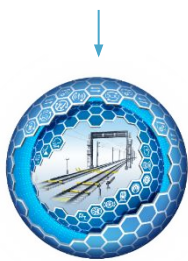
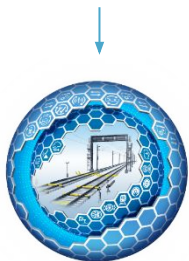
Planning a Data Strategy



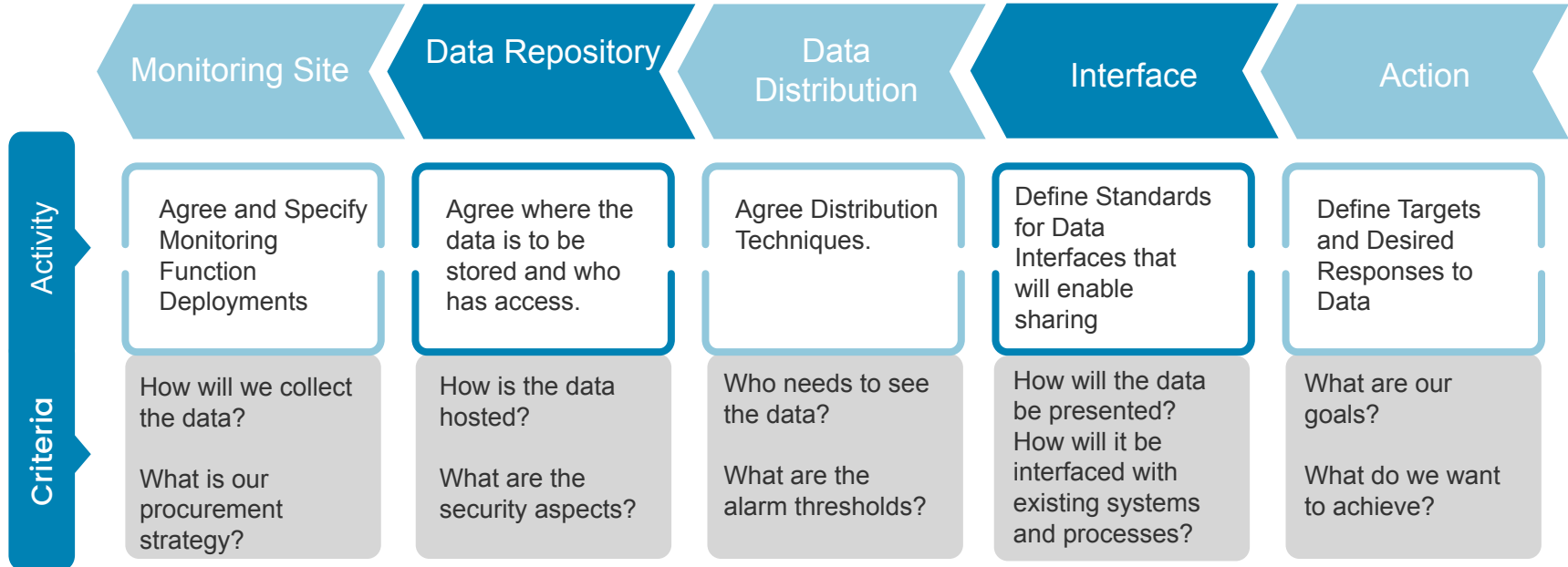
Planning a Data Strategy

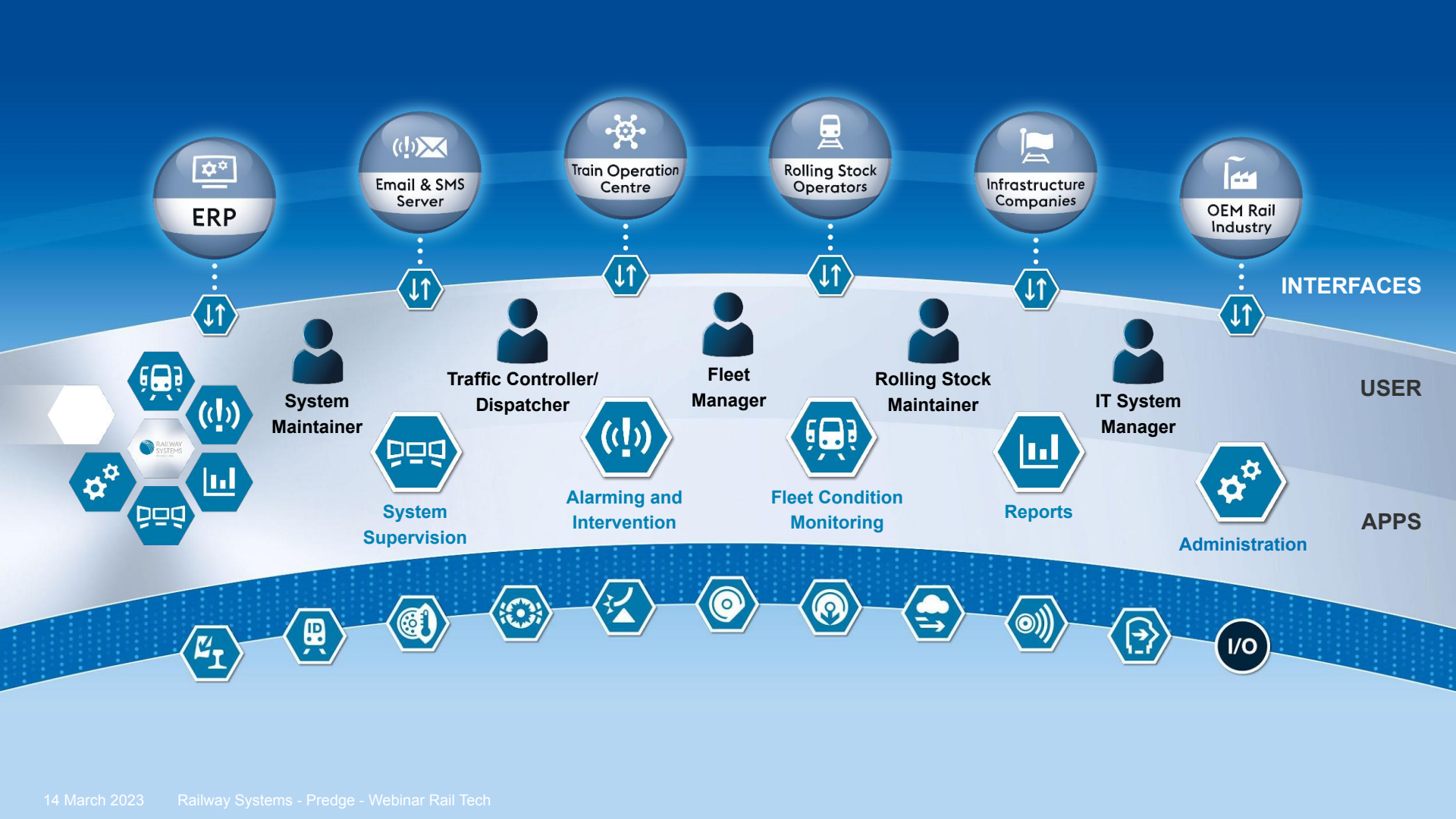


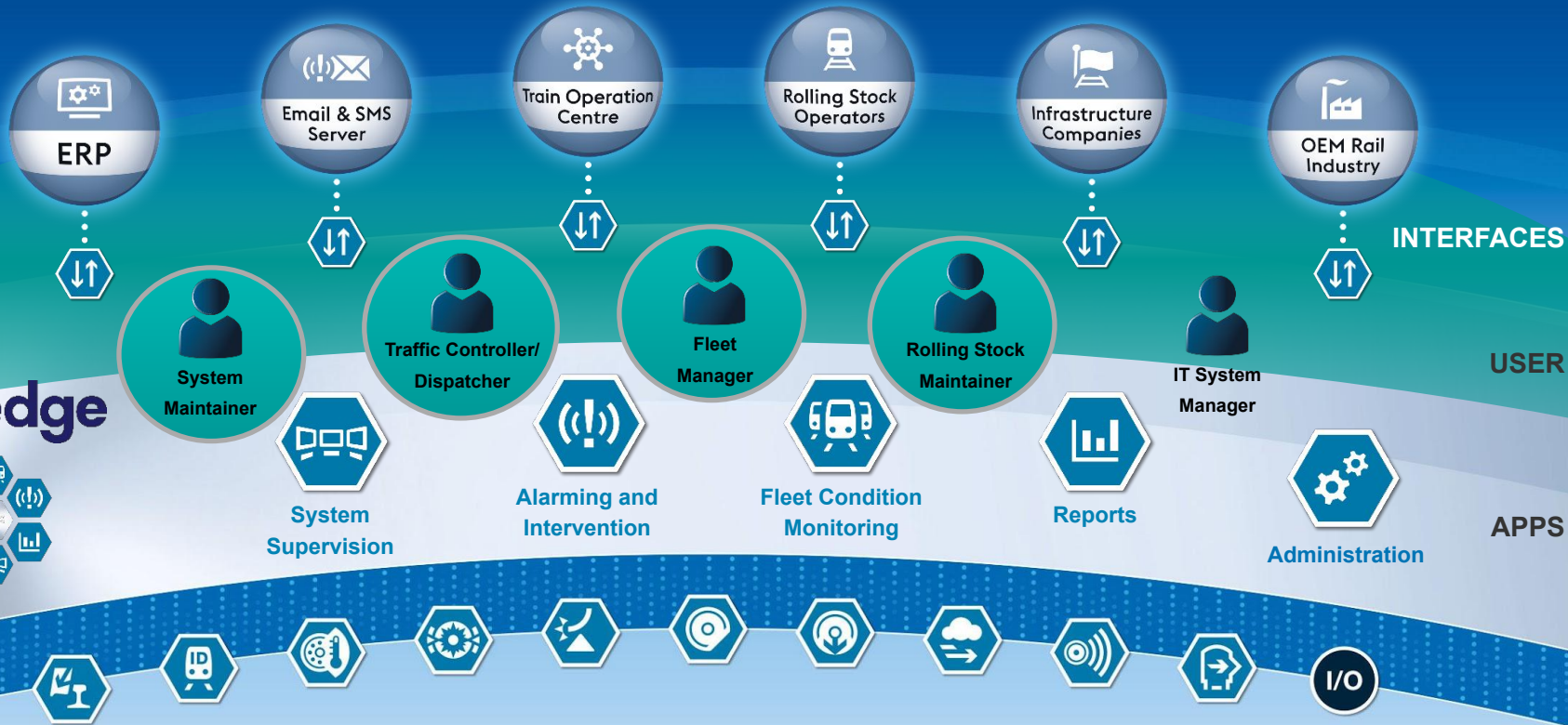
Planning a Data Strategy



Mapping The Data “Storyline”









Predge

Rolling Stock

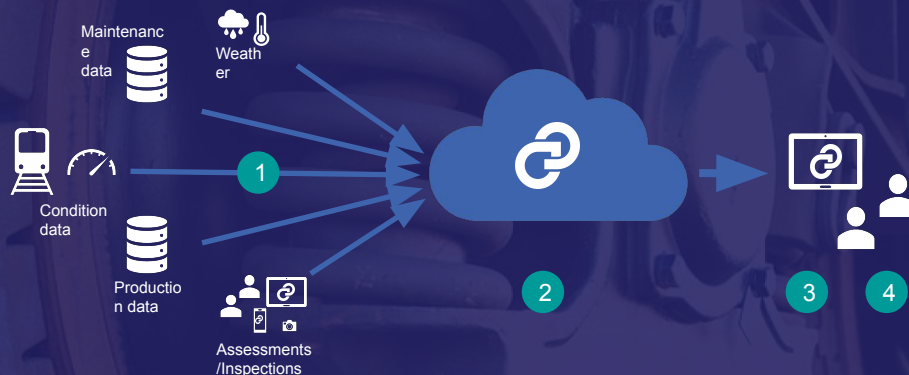
The reality of predictive maintenance:

- Actions are taken on predicted conditions**
- Quality of data and trust is crucial**
- Validation of value creation is continuous**

The Ultimate Way from Data to Decision

Technologies & Solutions

- 1 Agnostic approach for data acquisition and integration
- 2 Hybrid modelling approach
 - AI/ML principles
 - Physics of failure, domain knowledge
- 3 UX principles and tailored decision support
- 4 Automatic generation of workorders



Customers



Rolling Stock™ 2020-12-05 © 2015 Role: OC

Vehicle > 0980

EVN ID: 337445860980 Number of axes: 4

Type: Sdgms In vehicle sets: All

km last month: 12658

Vehicle status: Current status | Wheelsets

Wheel damage prediction

Wheel	Parameter	Est. Val	Horizon	Description
3-L	17	0		Established extensive damage
4-R	34	0		Established extensive damage

Diagrams and series: Time series

Parameter: Axle number

Rolling Stock™ 09:10 23 March 2020 Role: OC

Dashboard - OC

Recent south going trains

On-going (9102)

Recent north going trains

On-going (9803)

Definition: The most recent and on-going routes listed.

Order	Wagon	Min horizon	Alarm	Task
5	837447217071	20000 km	1	+
7	837447217071	20000 km	1	+
1	837447217071	20000 km	0	+
1	837447217071	20000 km	0	+
1	837447217071	20000 km	0	+
1	837447217071	20000 km	0	+
1	837447217071	20000 km	0	+

124 Vehicles 89 Axes

Detector Alarms

WSD Detections

2020-09-27 14:48 to 2020-09-27 23:16

Number	Duration	Vehicles	Axes
91124-91125	6.5h	42-42	172-172

Rolling Stock™

2022-01-31 10:44

ROLE SPECIFIC

- Dashboard

DATA APPS

- Data tools
- Custom apps
- Vehicles

SERVICE INFO

- Service health
- Data flows
- Events

DETECTOR INFO

- Map

SETTINGS

- Thresholds
- Vehicle sets
- Email notifications

SUPPORT

- Help & Feedback

Dashboard » Management

Role: Management

- Engineer-Loco
- Engineer-Wagon
- Management ✓
- Planner-Loco
- Planner-Wagon
- Repairer

Month and year to visualize

- All months -

2021

Update

Vehicle utilization (%)

WD Detections (qty)

Wagons per type of deviation

FlangeHeight

Generated WO (qty)

Wagon

Wheel Damage Prediction

ID	Axle	Level	RUL(km)	Extensive	Visible	Early
				Next WO		
4270	4-L	0	0			33833
4270	4-R	0	0			33833
4515	1-R	0	0			27097

3 results

Customer cases – Predge Rolling Stock



$\frac{70}{30} \rightarrow \frac{90}{10}$

predictive / reactive ratio

78%

reduced bearing failures

> 95%

successful proactive shunting



> 80%

avoided stops in line



Thank you

Richard Lenthall