



# Digitalization of the **Discrete Manufacturing Industry**


Claudio Coradeschi, Discrete Manufacturing Value Engineering SAP Italia

May, 2017

CUSTOMER

# Industry 4.0

**Why** enable companies to become **DIGITAL**

A photograph of Jeff Immelt, CEO of GE, speaking at a podium. He is wearing a dark suit and a light-colored tie. Behind him is a large blue screen with the GE logo. The foreground is dark, showing the silhouettes of audience members.

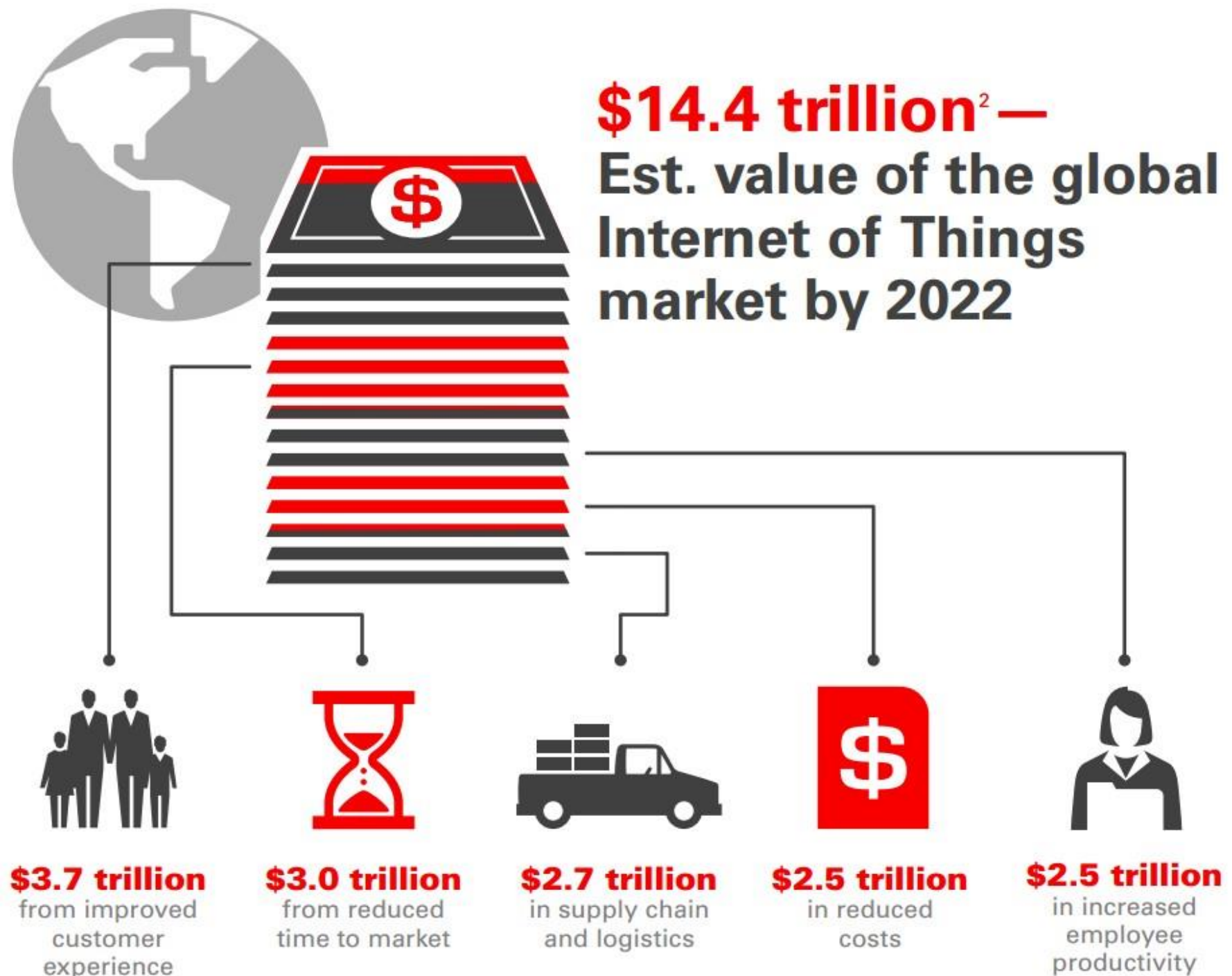
„If you went to bed last night as an industrial company, you’re going to wake up this morning as a software and analytics company.“

Jeff Immelt, CEO of GE, Minds+Machines Summit 2014

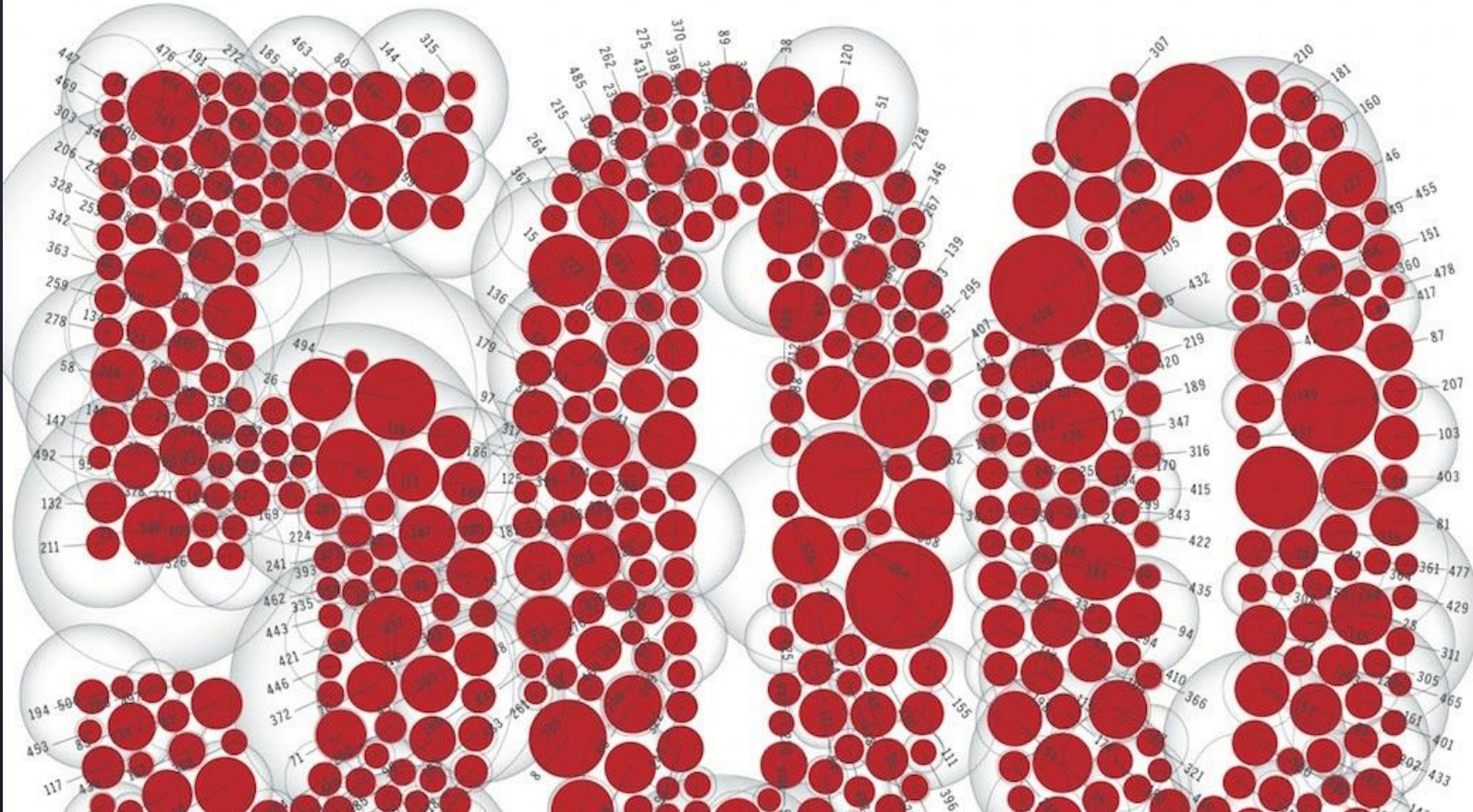


# Cisco predicts the global IoT “Value at Stake” will be \$14.4T by 2022

SOURCE: *Embracing the Internet of Everything To Capture Your Share of \$14.4 Trillion*, white paper published by Cisco



# FORTUNE



88%

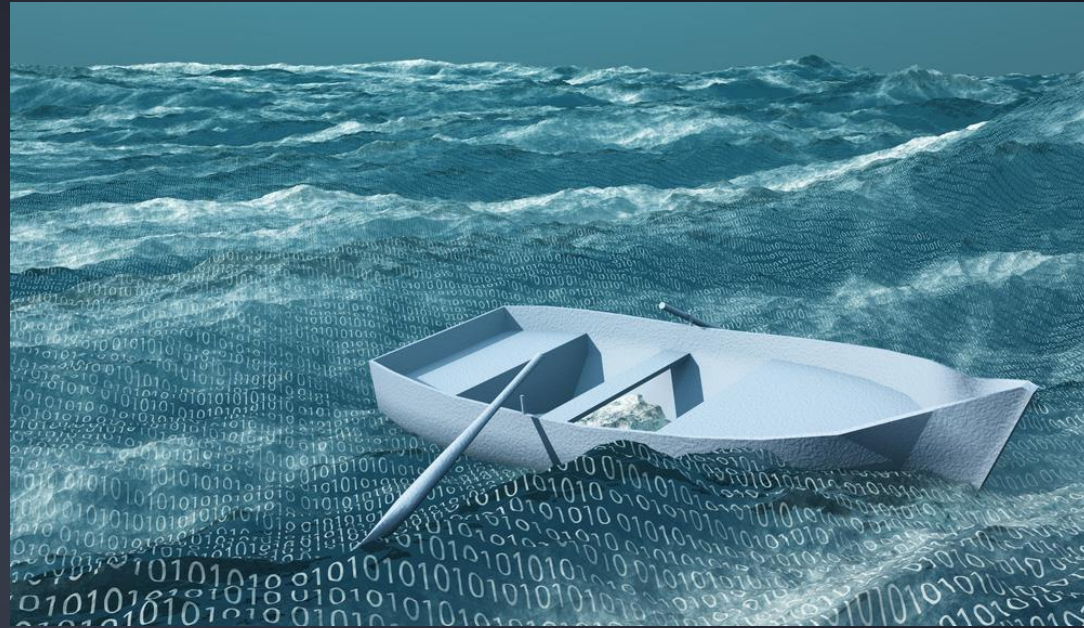
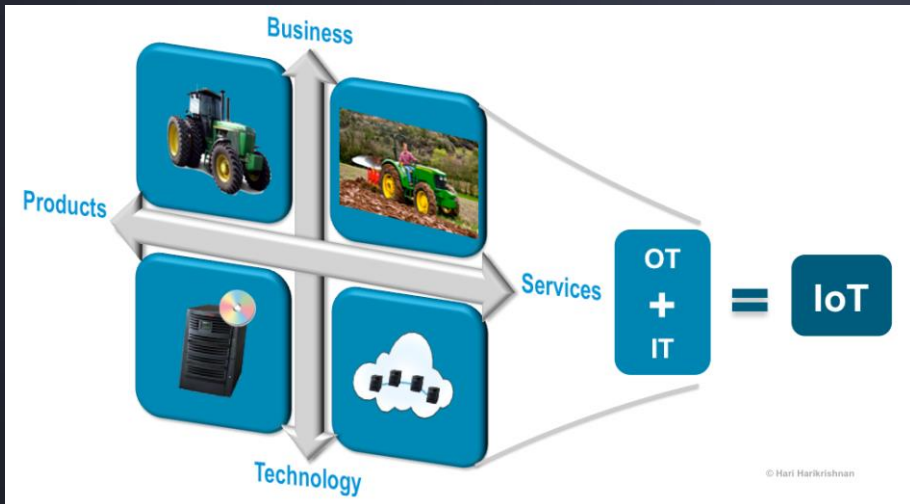
of the **FORTUNE 500**  
companies have  
**DROPPED** from the  
index between 1955  
and 2014



# Industry 4.0

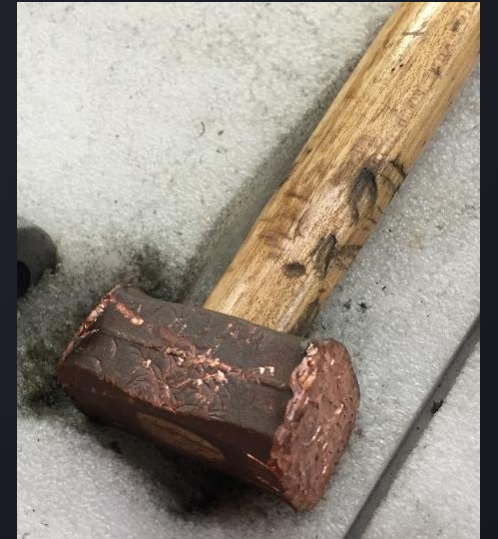
## Impression from Italy

How companies can integrate Information Technology (business) data with Operation Technology (process) Data ?



Big data,  
how collect,  
where store but  
.... what to do ?

Are equipment ready to  
become cyber-physical  
devices for Industry 4.0 ?



# Industry 4.0 – Customers' Perspectives

## Fears

People knowledge not always available (data scientist)  
Business case not clear / difficult to define the scope



## Resistances

Internet infrastructure reliability  
Products/machines not ready for connection



## Expectation

Customer wants "More with Less"  
Higher Profitability with new opportunities  
"Piano Calenda"



# 90%

of CEOs believe the digital economy will impact their industry, but less than 15% have a digital strategy

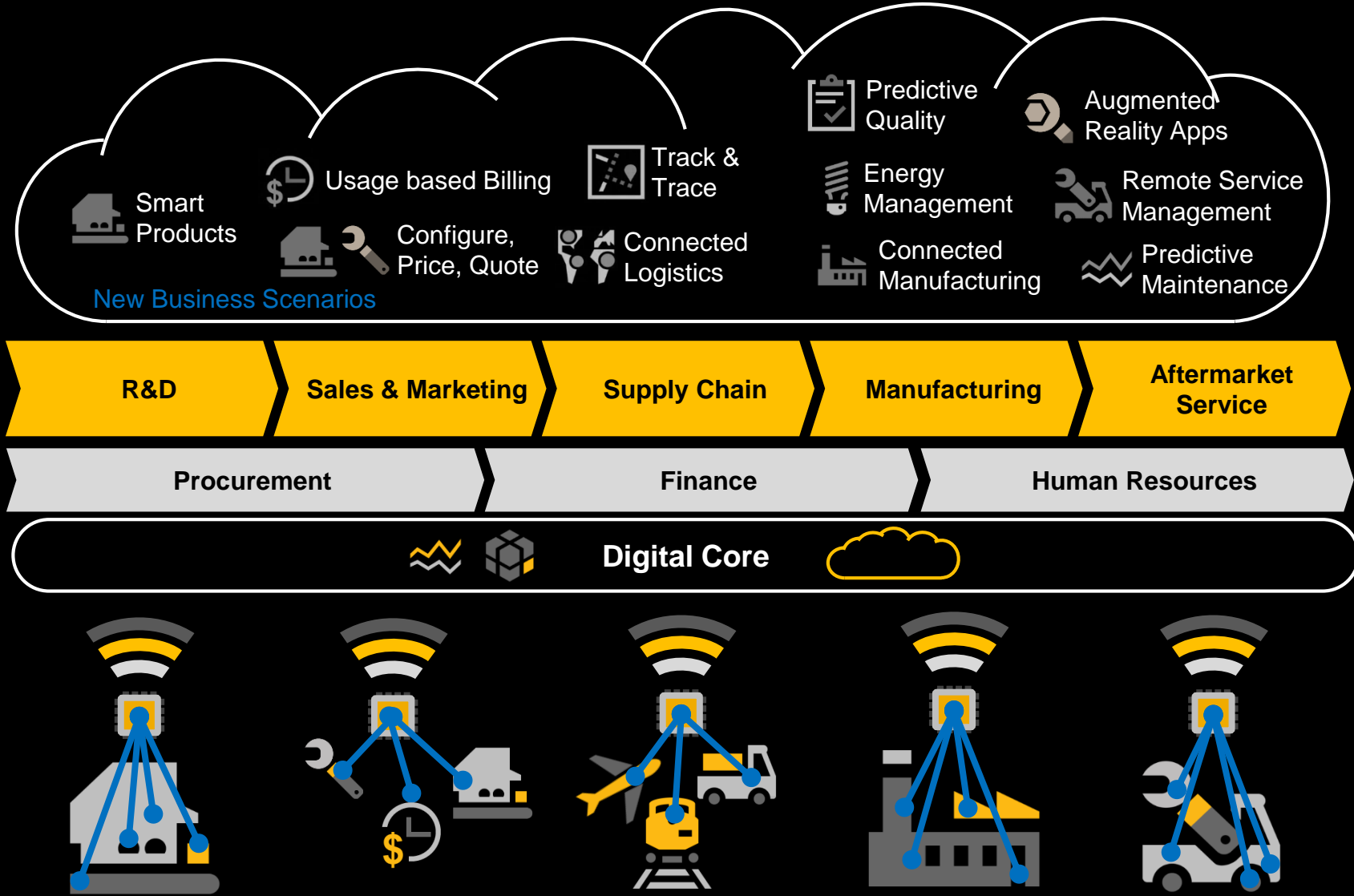


# Industry 4.0

**How** enable companies to become **DIGITAL**

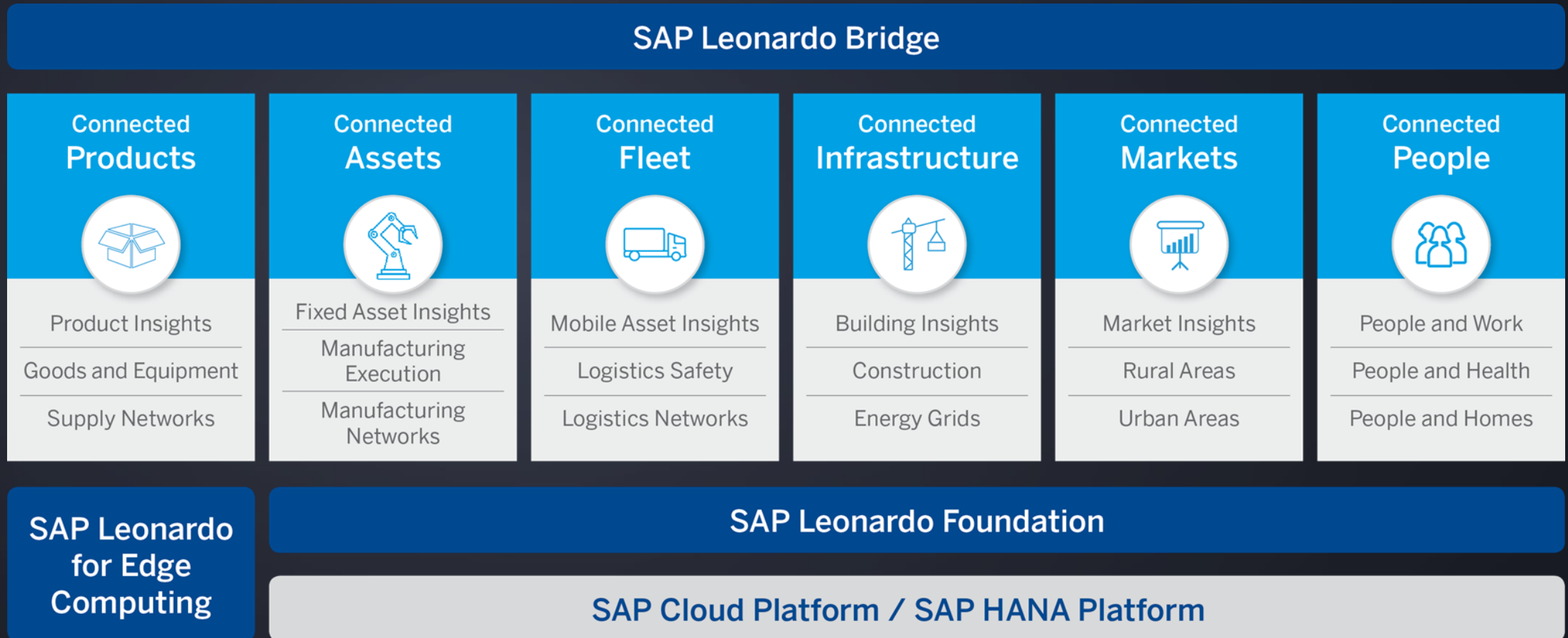
# Digitalization for Industrial Machinery & Components

## Value creation through deep process and data integration



# Connecting Things with People and Processes

## SAP Leonardo Innovation Portfolio





# Industry 4.0

Vision of a **DIGITAL** company

**Imagine a  
manufacturer of  
industrial robots**







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## Map



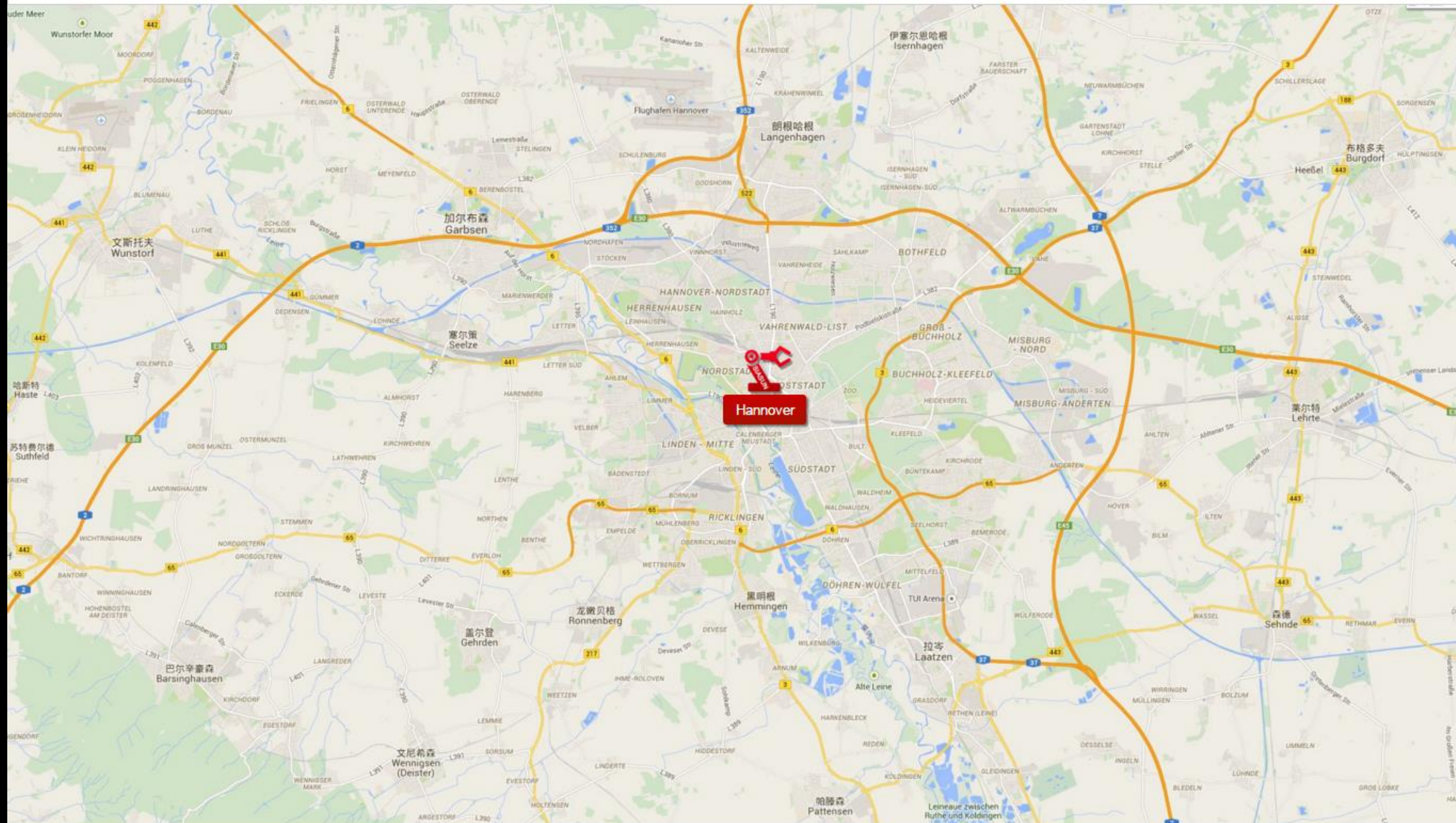




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## Map





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Plant Hannover (16)



Robot

Search

Vertical Articulated  
Robot N\_02111  
mmVertical Articulated  
Robot N\_001

8

Vertical Articulated  
Robot N\_0037  
mmVertical Articulated  
Robot N\_0053  
mmVertical Articulated  
Robot N\_0075  
mmVertical Articulated  
Robot N\_0096  
mmVertical Articulated  
Robot N\_0115  
mm

## Vertical Articulated Robot N\_021

11  
mm

Tremendous increase of vibration indicates potential issue of a decelerator in the robot within the next 3 days.

Max. Vibration: 10 mm



Monitor

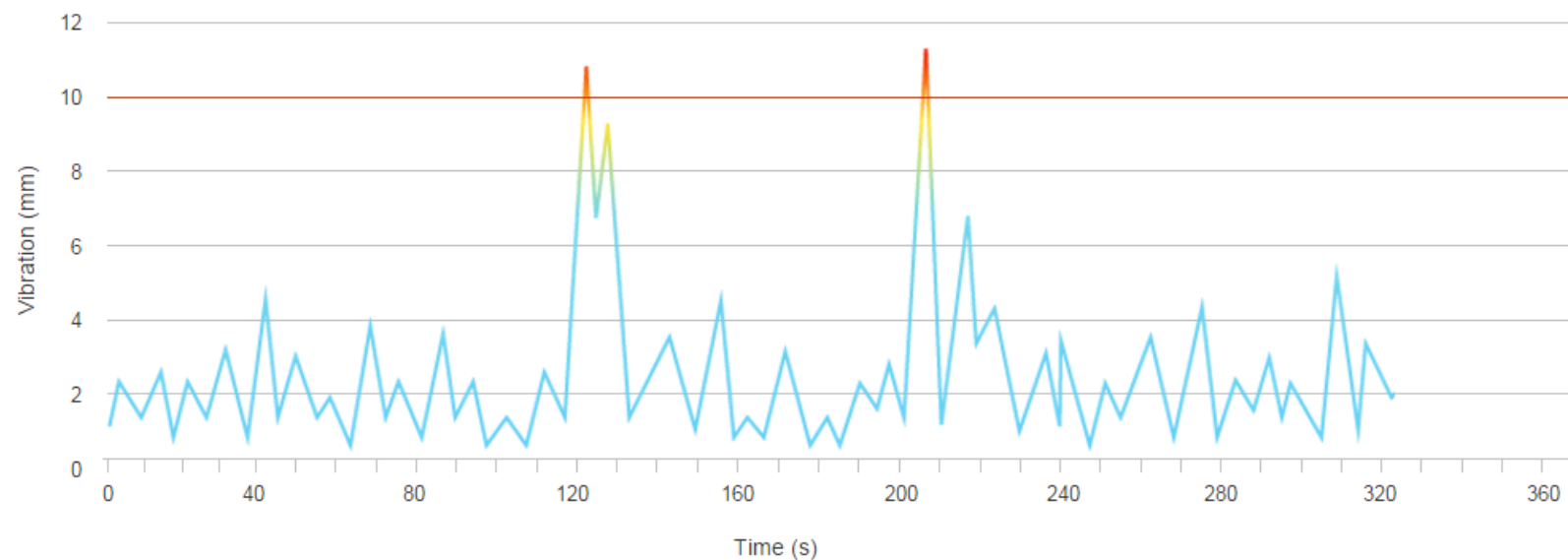


Performance



Service

## Vibration of Decelerator



Create Service Order





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Plant Hannover (16)



Robot

Search

Vertical Articulated  
Robot N\_02111  
mm

## Vertical Articulated Robot N\_021

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mm

Tremendous increase of vibration indicates potential issue of a decelerator in the robot within the next 3 days.

Max. Vibration: 10 mm



Monitor



Performance



Service

Vertical Articulated  
Robot N\_0037  
mm

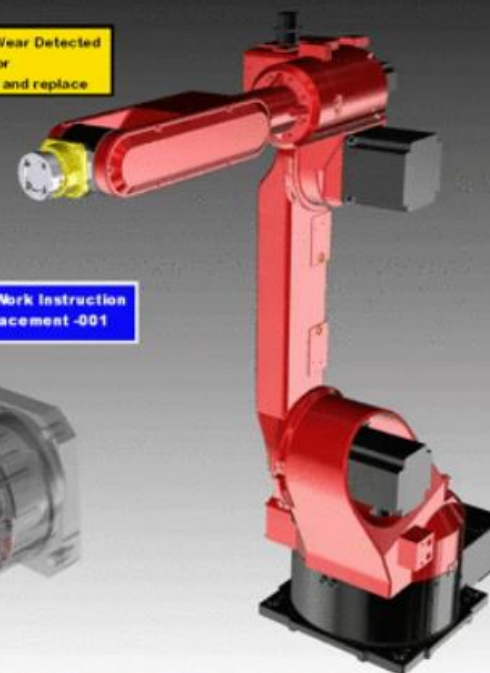
Machine Type: SEPARATOR

Machine Subtype: MSI 350-01-772

Vertical Articulated  
Robot N\_0053  
mmVertical Articulated  
Robot N\_0075  
mmVertical Articulated  
Robot N\_0096  
mmVertical Articulated  
Robot N\_0115  
mm

**WARNING:** Excessive Wear Detected  
**UNIT:** Decelerator  
**RECOMMENDATION:** Locate unit and replace

Proceed to Visual Work Instruction  
Decelerator Replacement -001



Create Service Order





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Plant Hannover (16)



Robot

Search

Vertical Articulated  
Robot N\_02111  
mmVertical Articulated  
Robot N\_001

8

Vertical Articulated  
Robot N\_0037  
mmVertical Articulated  
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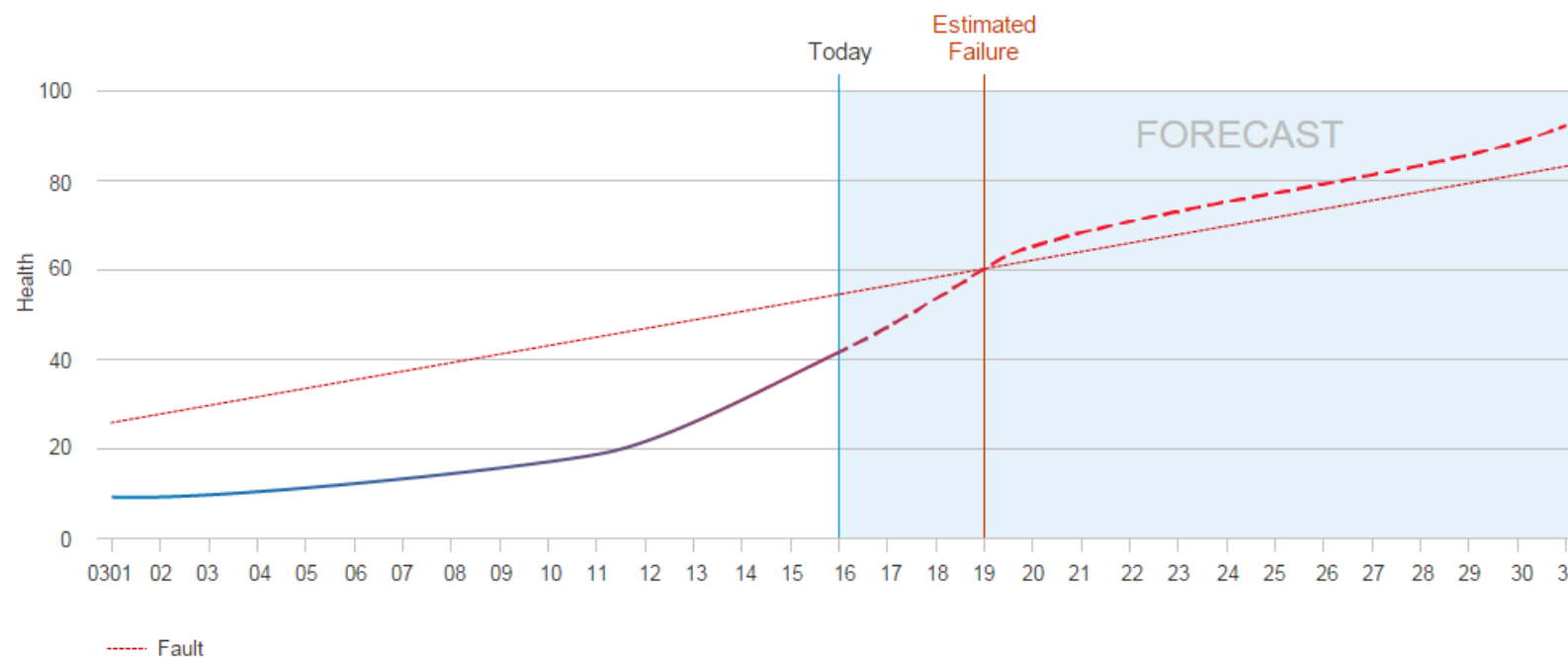


Performance



Service

## Vibration of Decelerator



Create Service Order



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## Service Order

Service Order: 4500017982

Customer Name: CeBIT Automation

Description: Tremendous increase of vibration indicates cause issue of a decelerator.

Service Date: 18/03/2015

Location: Trammplatz 2 30159 Hannover

## Steps (3)



See if decelerator can be reused.

30 Min



Replace decelerator.

40 Min



Test the decelerator.

40 Min

## Item (1)

No.	Description	Quantity	Delivery Date	Status
49122	Decelerator Type 47/15	1	16/03/2015	✓ Available

## Internal Technician (0 / 2)

Technician	Rating	Lead Time	Skill	Hourly Rate	Status
Reinhard Kuntze	★★★★★ (35)	15 Days	<div><div></div></div>	45 EUR	✗ Not Match
Bernd Schreiner	★★★★★ (47)	7 Days	<div><div></div></div>	37 EUR	✗ Not Match



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## Business Network



## Technician – External Vendor (5 / 39)

<input type="checkbox"/>	Technician	Supplier Name	Rating	Avg. Lead Time	Distance	Skill	Hourly Rate	Status
<input checked="" type="checkbox"/>	Johannes Dreher	Talent onDemand	★★★★★ (196)	2 Days	19 km	<div><div></div></div>	35 EUR	Recommend
<input type="checkbox"/>	Frank Zimmermann	Talent onDemand	★★★★☆ (271)	3 Days	45 km	<div><div></div></div>	32 EUR	Match
<input type="checkbox"/>	Thomas Maie	EVF Global	★★★★☆ (221)	2 Days	45 km	<div><div></div></div>	31 EUR	Match
<input type="checkbox"/>	Gerald Wagner	EVF Global	★★★★☆ (172)	3 Days	38 km	<div><div></div></div>	28 EUR	Match
<input type="checkbox"/>	Jochen Lang	Talent onDemand	★★★★☆ (273)	2 Days	42 km	<div><div></div></div>	32 EUR	Match
<input type="checkbox"/>	Friedrich Busch	ManPower Co.	★★★★☆ (156)	3 Days	55 km	<div><div></div></div>	30 EUR	Not Match
<input type="checkbox"/>	Albrecht Schrempf	EVF Global	★★★★☆ (244)	18 Days	69 km	<div><div></div></div>	32 EUR	Not Match
<input type="checkbox"/>	Anton Tischler	ManPower Co.	★★★★☆ (116)	15 Days	45 km	<div><div></div></div>	33 EUR	Not Match
<input type="checkbox"/>	Ingo Bach	EVF Global	★★★★☆ (191)	15 Days	62 km	<div><div></div></div>	33 EUR	Not Match

Assign





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Save



# Industry 4.0

Reality of a **DIGITAL** company



# Dynamic Maintenance Management System: Trenitalia

## Company

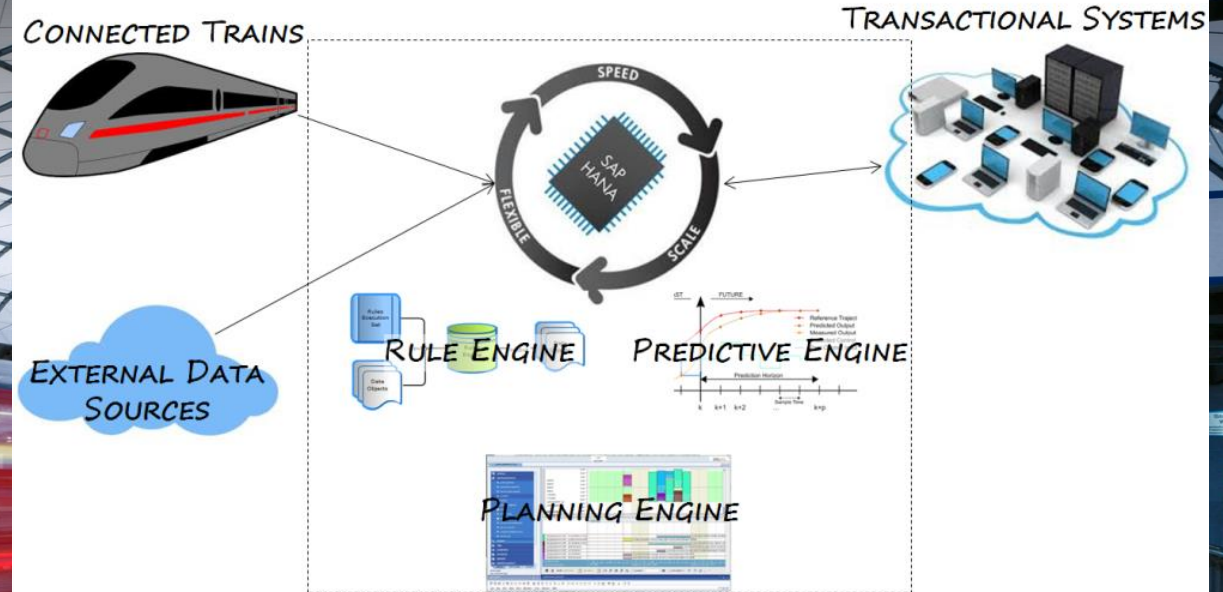
The company owns and operates a fleet of around 2.000 electro-trains, 2.000 locomotives and 30.000 coaches and wagons.

Situation: 40% of maintenance effort is for corrective maintenance. Maintenance of rolling stock has been identified as one aspect of the Digital Transformation.

## Solution

- Custom solution on SAP HANA
- Data fusion between IT and OT data
- Multidimensional assets description
- Remote train diagnostics
- Engineering rules and predictive models
- Indicators-based planning
- Dynamic optimization of maintenance schedules

## Process/Technology Innovation

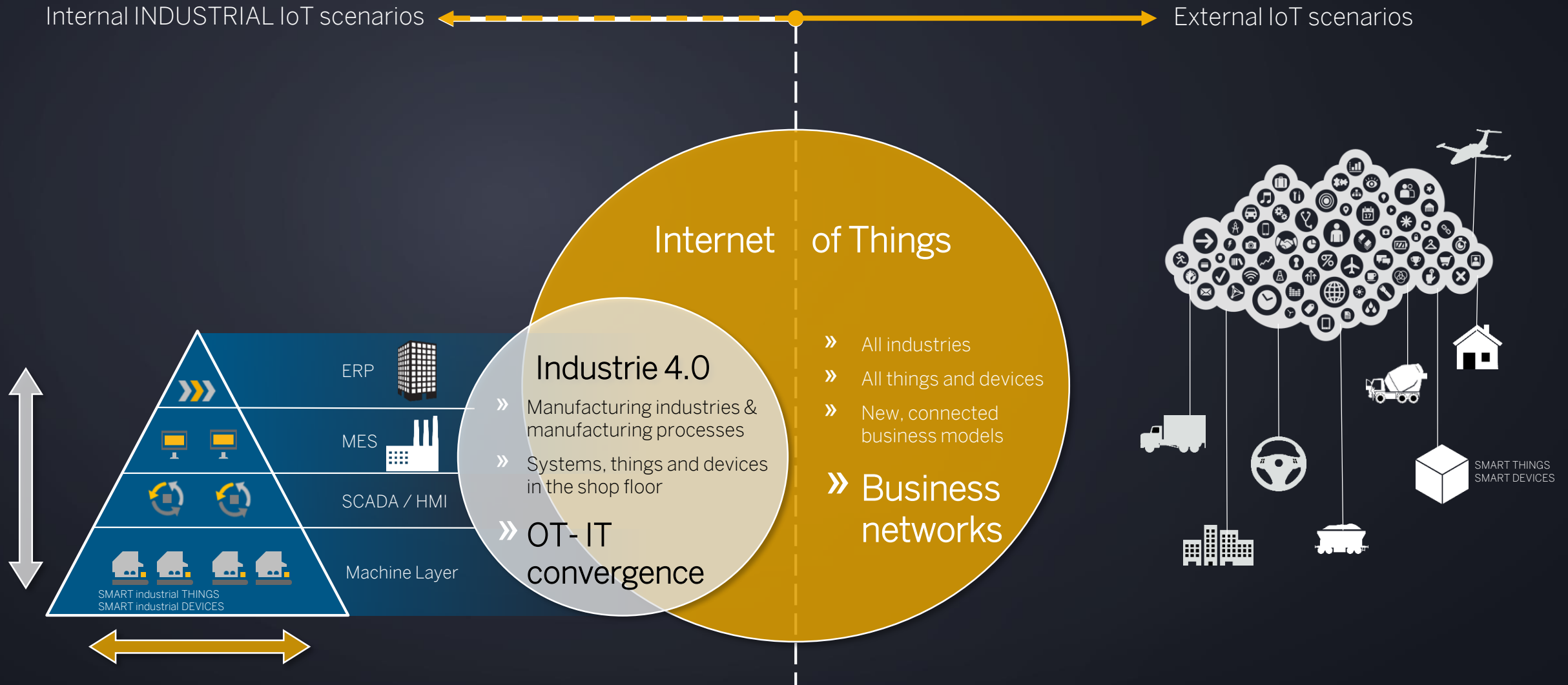


## Benefits

- Higher asset availability leading to higher passenger satisfaction
- Less effort for corrective maintenance

# The Internet of Things and its Impact on Manufacturing

It is all about the opportunities to serve your customers better



# Thank you.

**Claudio Coradeschi**

Discrete Industry Value Engineer – SAP Italia







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