



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**

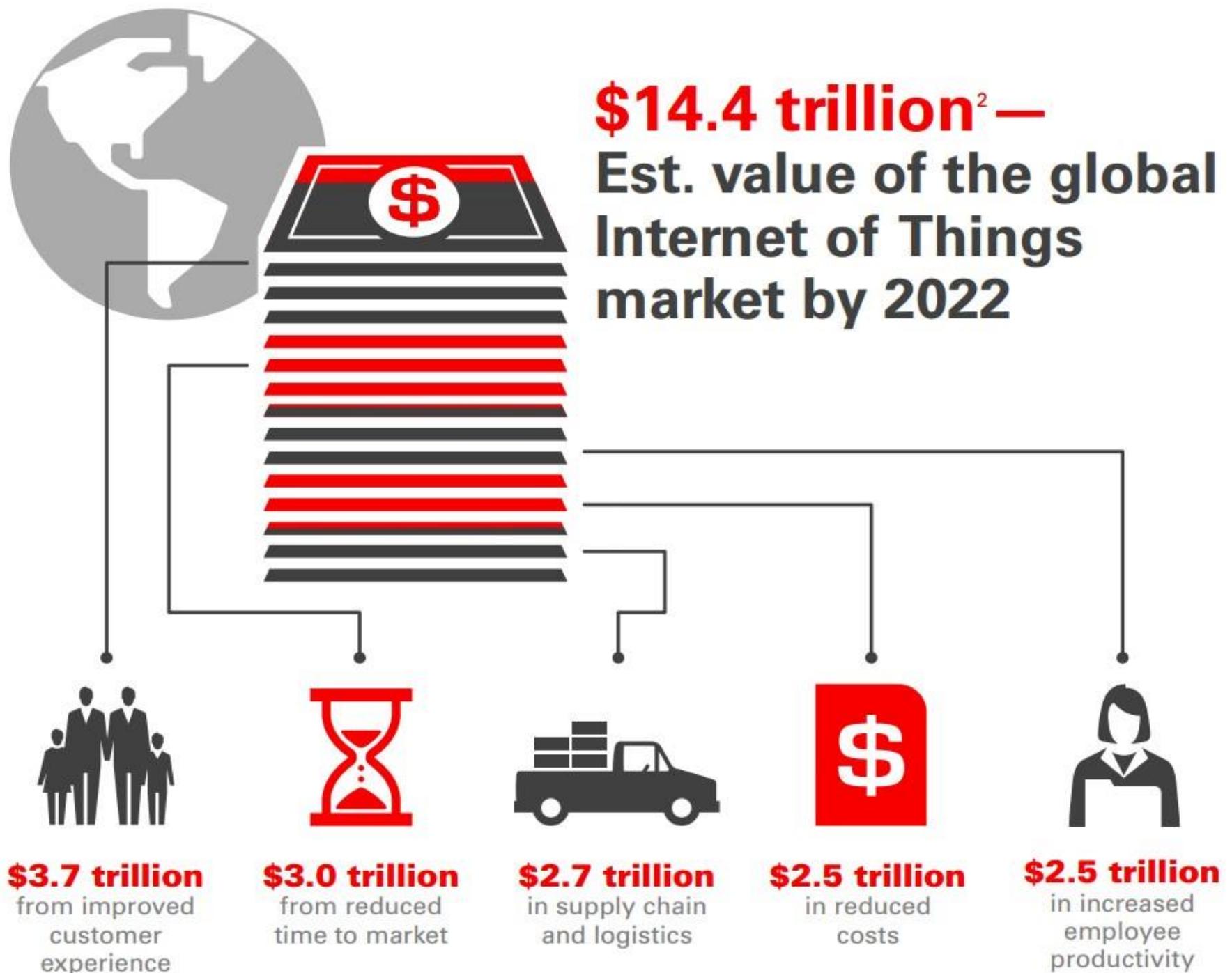
A photograph of Jeff Immelt, CEO of GE, speaking at a stage. He is wearing a dark suit and a light-colored tie. Behind him is a large blue screen with the GE logo. The scene is lit with blue light, and the silhouettes of audience members are visible in the foreground.

„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.“

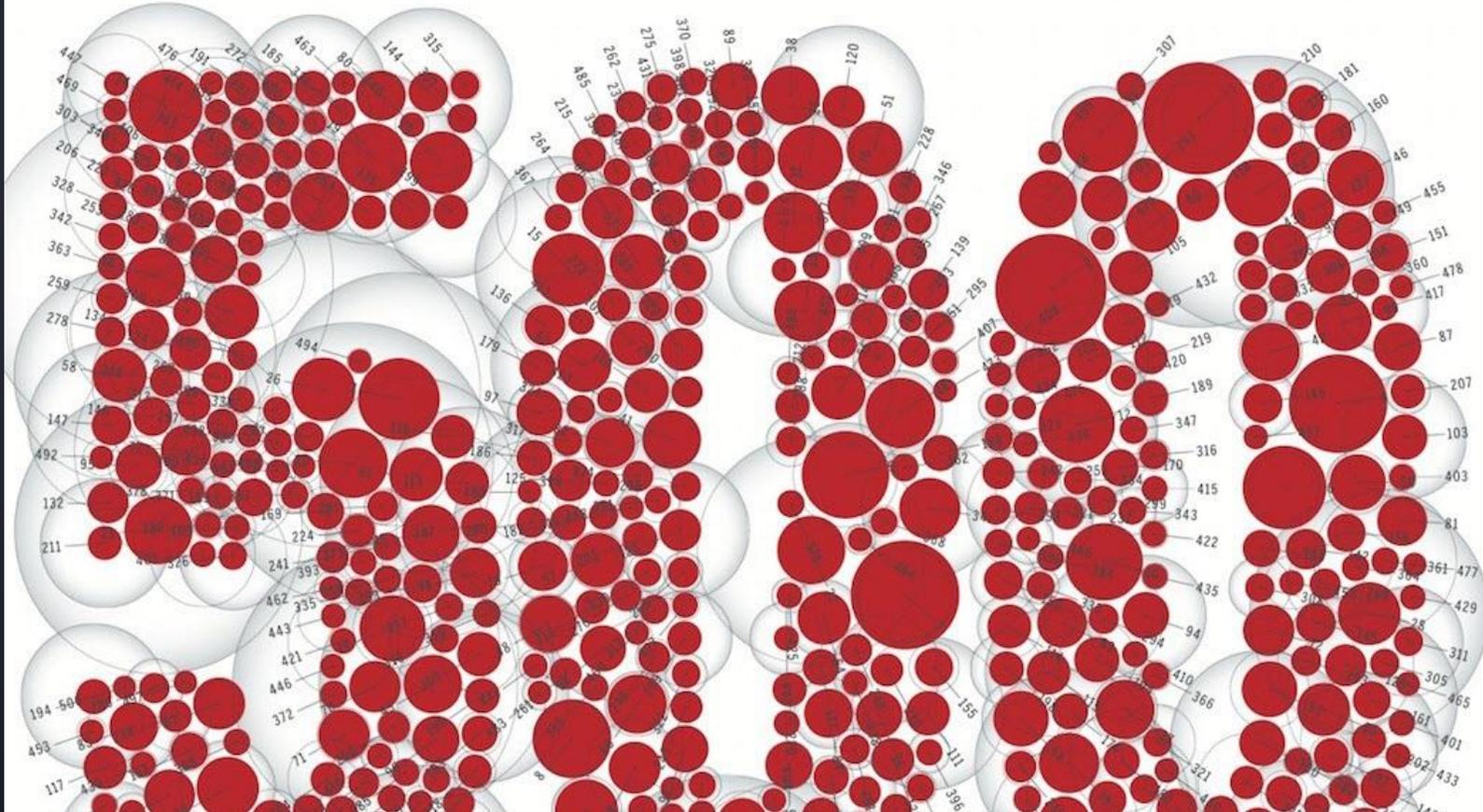
Jeff Immelt, CEO of GE, Minds+Machines Summit 2014

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

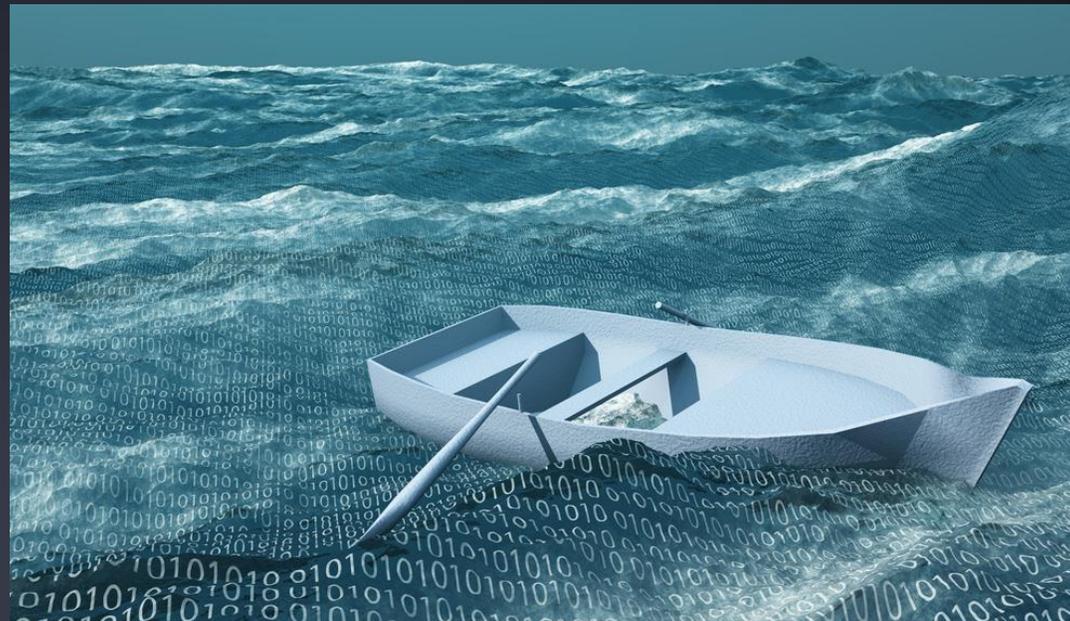
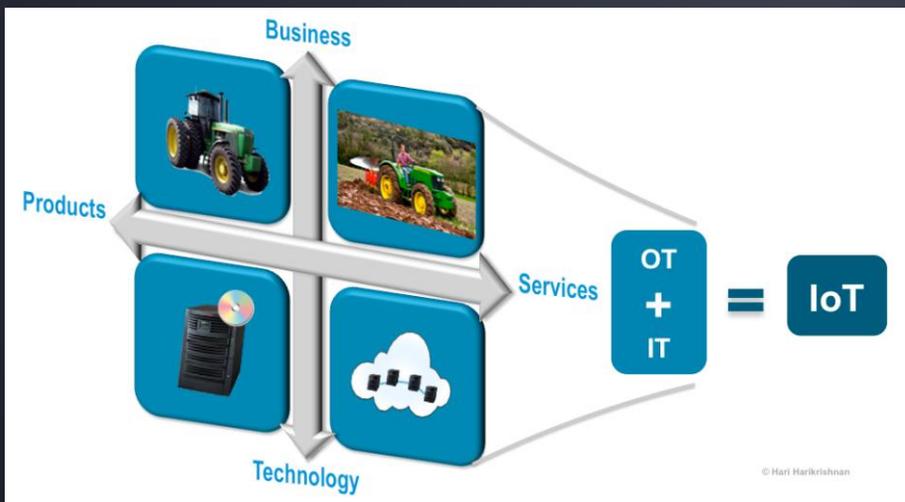


88%

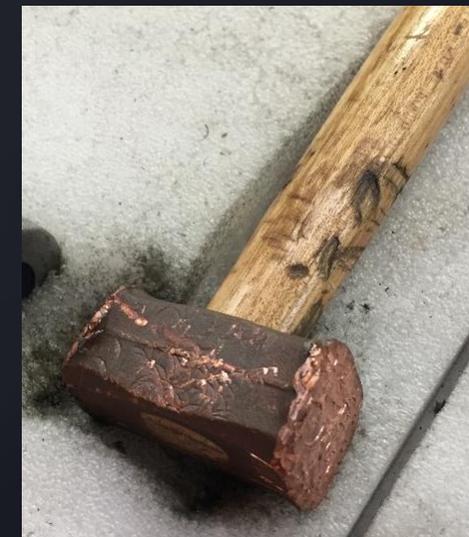
of the **FORTUNE 500**
companies have
DROPPED from the
index between 1955
and 2014

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**

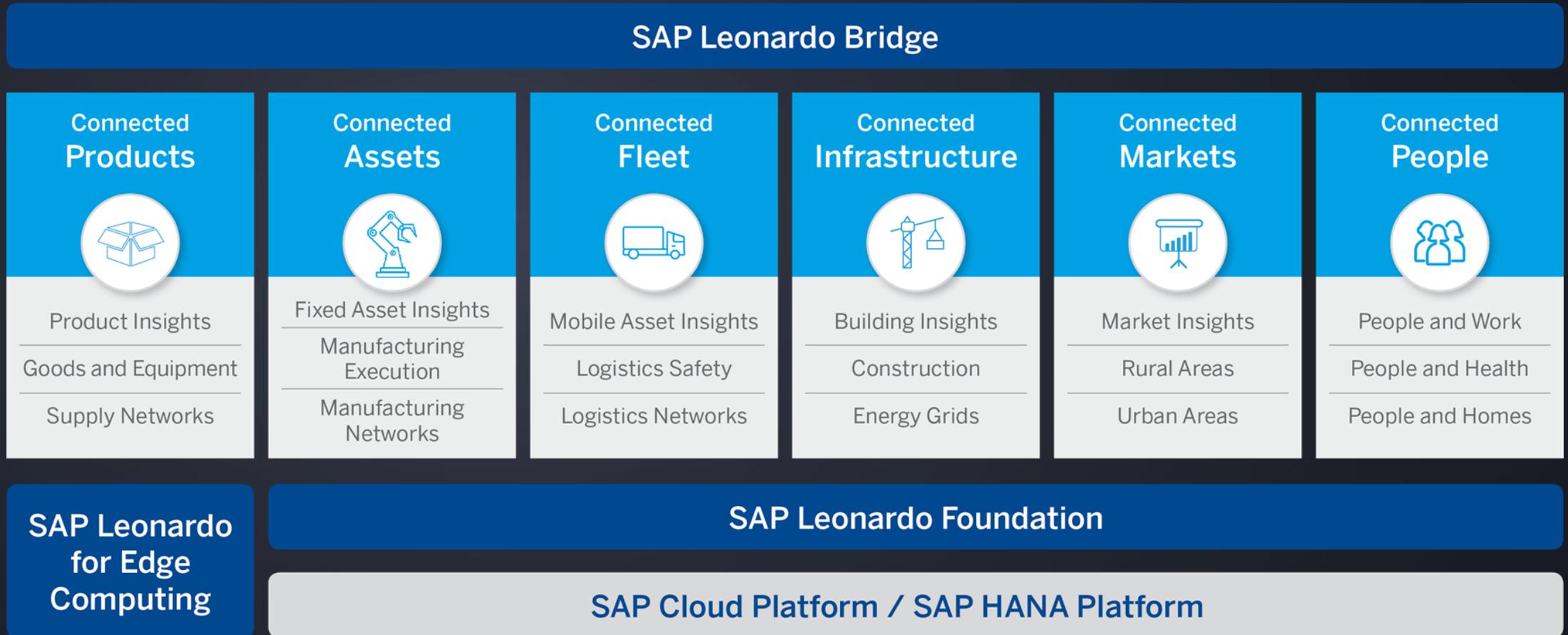
Digitalization for Industrial Machinery & Components

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





Map

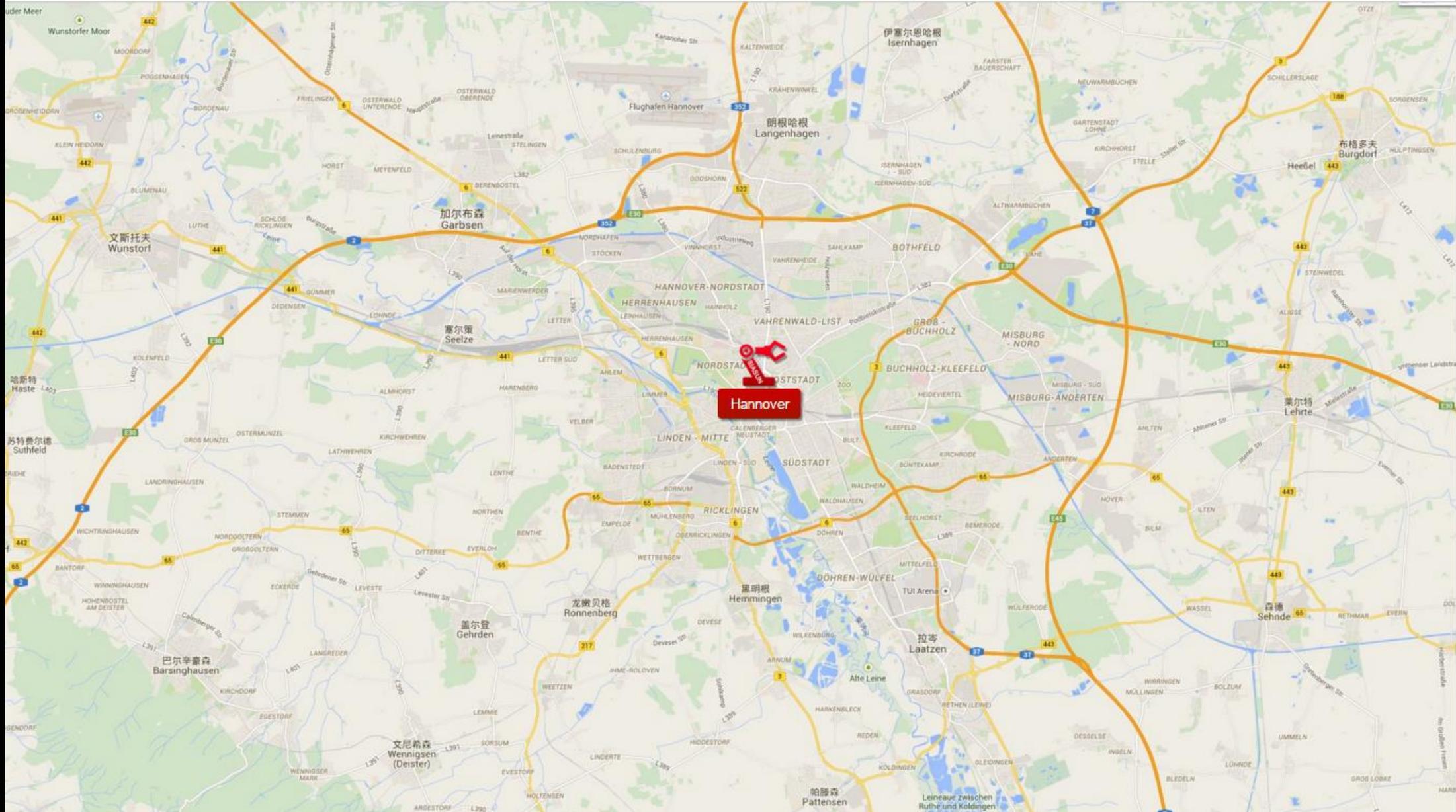




Noah Schmid



Map





Search 🔍

Vertical Articulated Robot N_021 11 mm

Vertical Articulated Robot N_001 8 mm

Vertical Articulated Robot N_003 7 mm

Vertical Articulated Robot N_005 3 mm

Vertical Articulated Robot N_007 5 mm

Vertical Articulated Robot N_009 6 mm

Vertical Articulated Robot N_011 5 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

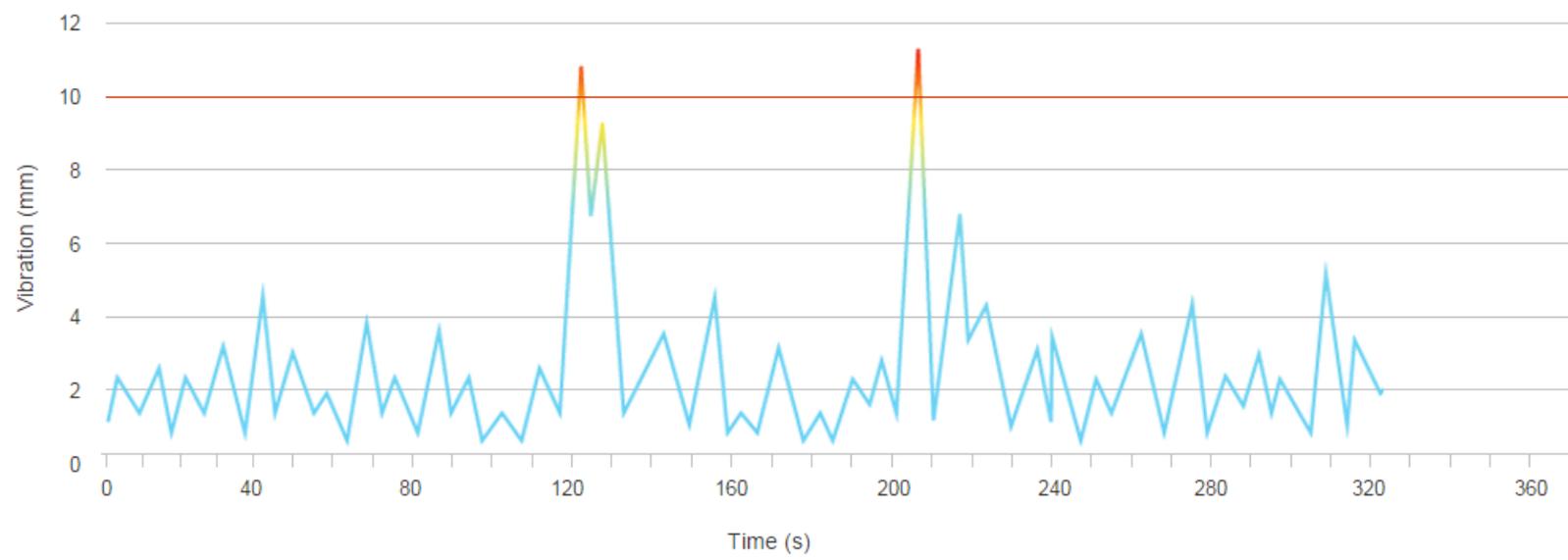


Performance



Service

Vibration of Decelerator



— Threshold



Search ↻ 🔍

Vertical Articulated Robot N_021 11 mm

Vertical Articulated Robot N_001 8 mm

Vertical Articulated Robot N_003 7 mm

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Monitor



Performance



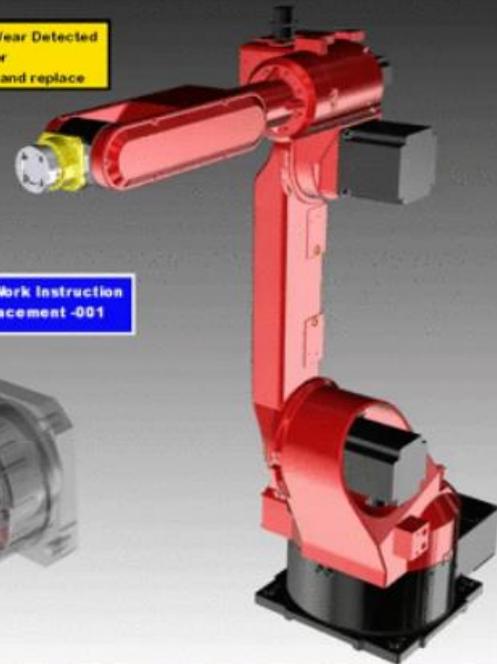
Service

Machine Type: SEPARATOR
Machine Subtype: MSI 350-01-772



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

Proceed to Visual Work Instruction
Decelerator Replacement -001





Search ↻ 🔍

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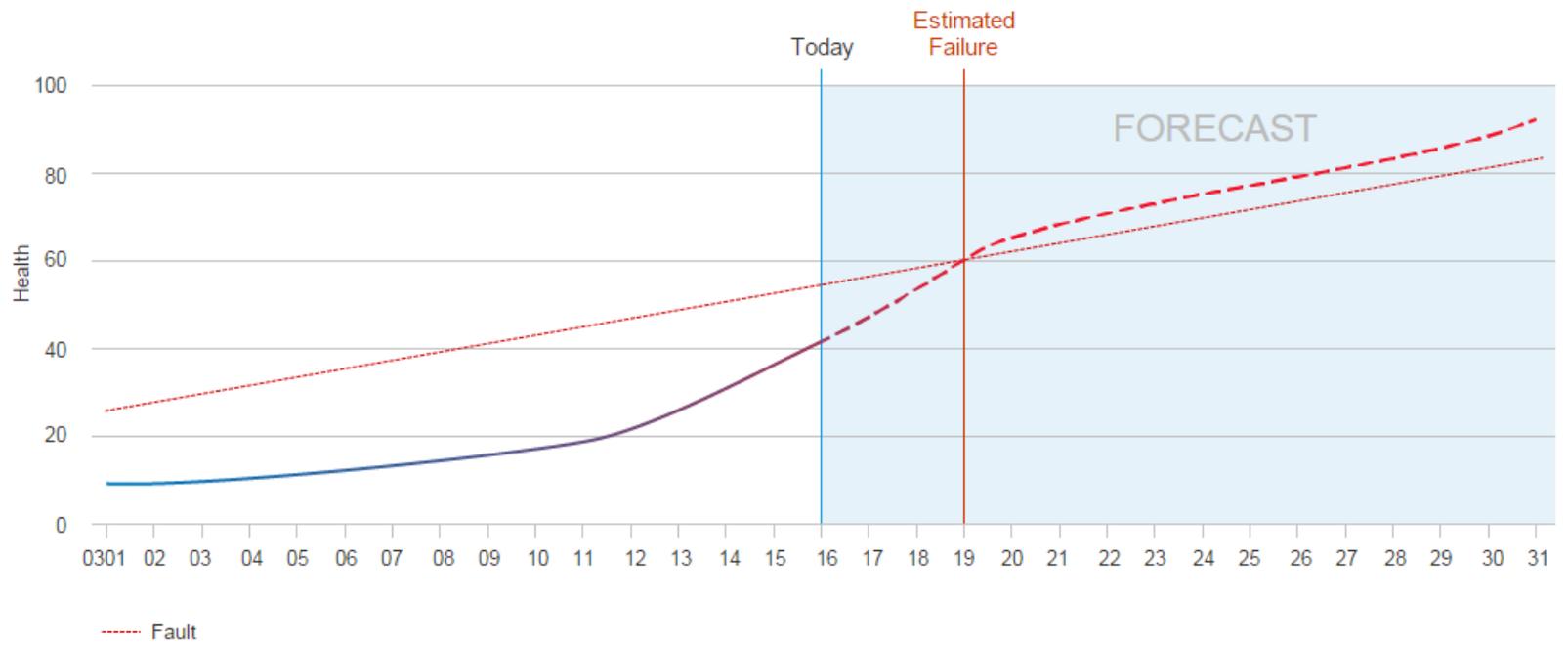


Performance



Service

Vibration of Decelerator





Noah Schmid



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 style="width: 75%; background-color: green;"></div>	45 EUR	✗ Not Match
Bernd Schreiner	★★★☆☆ (47)	7 Days	<div style="width: 50%; background-color: red;"></div>	37 EUR	✗ Not Match



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 style="width: 100%; height: 10px; background-color: green;"></div>	35 EUR	Recommend
<input type="checkbox"/>	Frank Zimmermann	Talent onDemand	★★★★☆ (271)	3 Days	45 km	<div style="width: 90%; height: 10px; background-color: green;"></div>	32 EUR	Match
<input type="checkbox"/>	Thomas Maie	EVF Global	★★★★☆ (221)	2 Days	45 km	<div style="width: 90%; height: 10px; background-color: green;"></div>	31 EUR	Match
<input type="checkbox"/>	Gerald Wagner	EVF Global	★★★★☆ (172)	3 Days	38 km	<div style="width: 90%; height: 10px; background-color: green;"></div>	28 EUR	Match
<input type="checkbox"/>	Jochen Lang	Talent onDemand	★★★★☆ (273)	2 Days	42 km	<div style="width: 90%; height: 10px; background-color: green;"></div>	32 EUR	Match
<input type="checkbox"/>	Friedrich Busch	ManPower Co.	★★★★☆ (156)	3 Days	55 km	<div style="width: 20%; height: 10px; background-color: red;"></div>	30 EUR	Not Match
<input type="checkbox"/>	Albrecht Schrempf	EVF Global	★★★★☆ (244)	18 Days	69 km	<div style="width: 90%; height: 10px; background-color: green;"></div>	32 EUR	Not Match
<input type="checkbox"/>	Anton Tischler	ManPower Co.	★★★★☆ (116)	15 Days	45 km	<div style="width: 90%; height: 10px; background-color: green;"></div>	33 EUR	Not Match
<input type="checkbox"/>	Ingo Bach	EVF Global	★★★★☆ (191)	15 Days	62 km	<div style="width: 90%; height: 10px; background-color: green;"></div>	33 EUR	Not Match



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Save



Map



Industry 4.0

Reality of a **DIGITAL** company

Dynamic Maintenance Management System: Trenitalia

Company

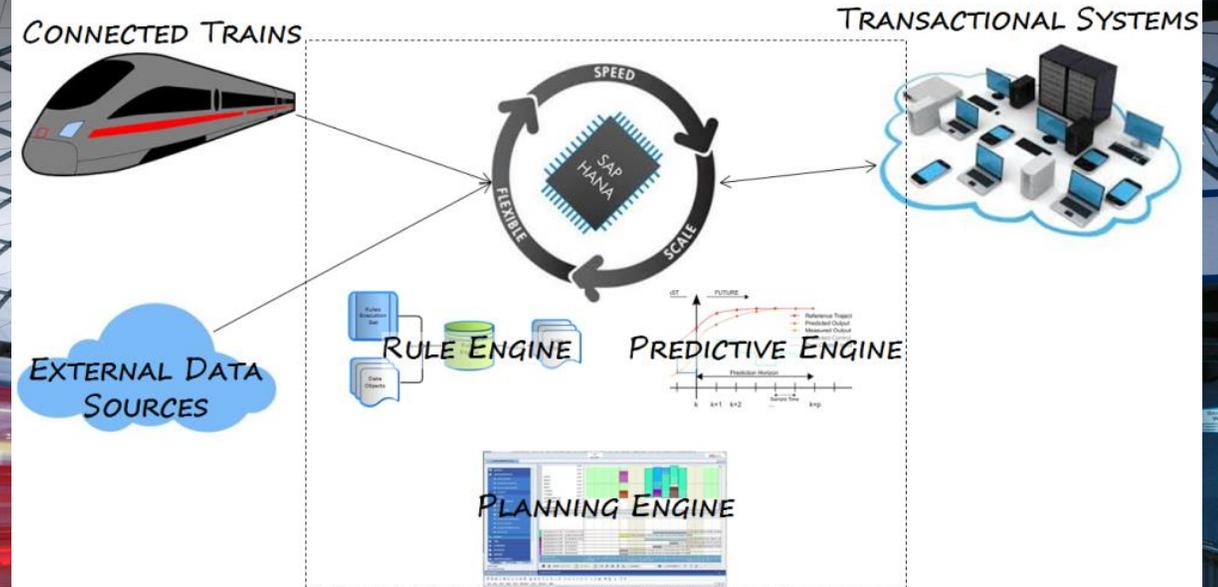
The company owns and operates a fleet of around 2.000 electro-trains, 2.000 locomotives and 30.000 coaches and wagons.

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

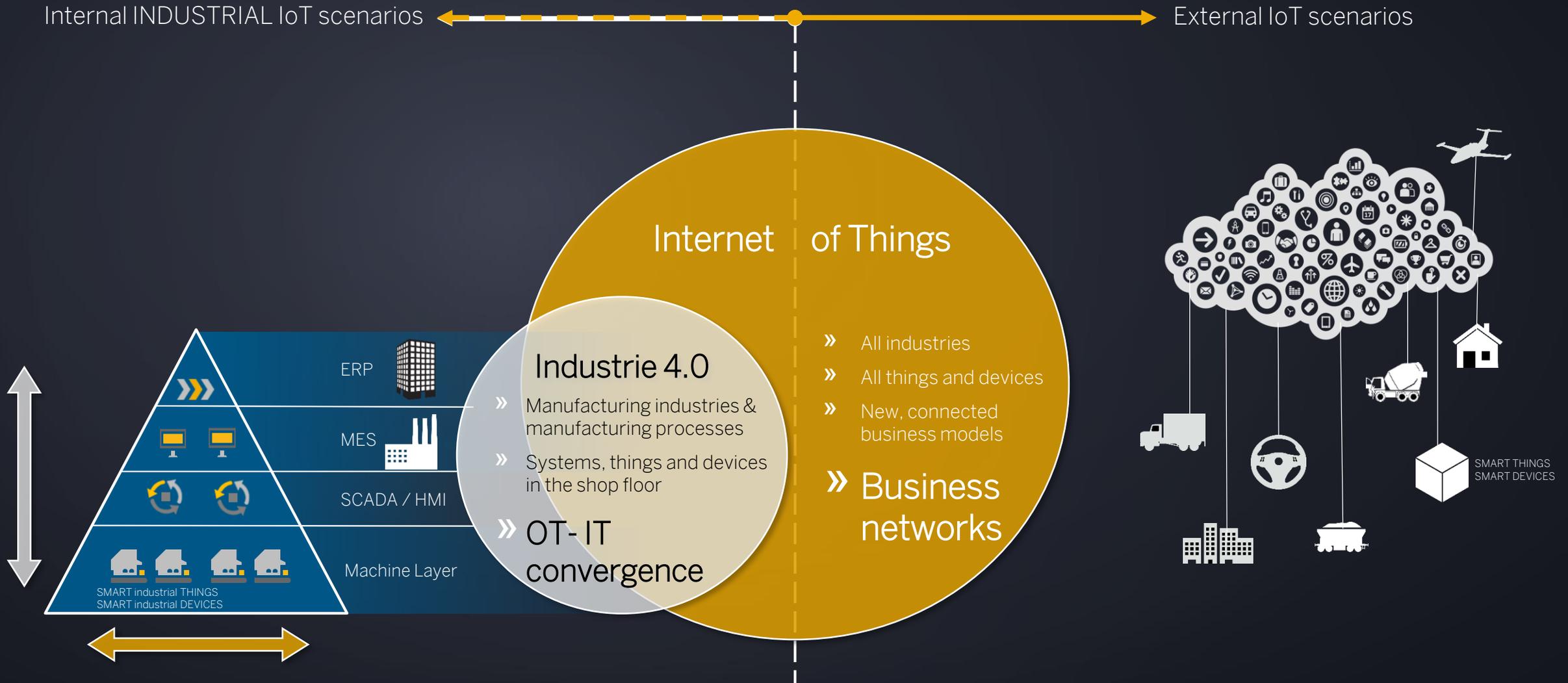


Benefits

- 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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