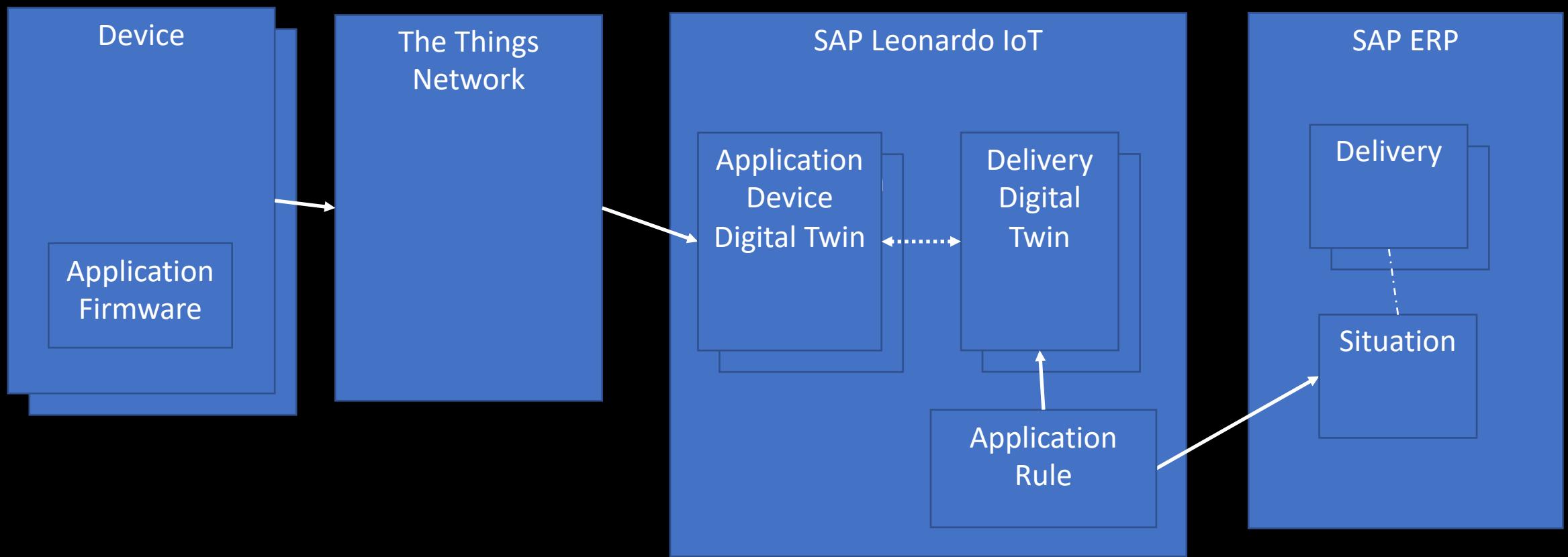


Possible Integration Scenario of The Things Network & SAP ERP to support Delivery Tracking

Marcus Behrens, Director Product Management, SAP SE

Architecture



Demo

Data and Process Mapping

Step 1: TTN Node & SAP ERP running in parallel

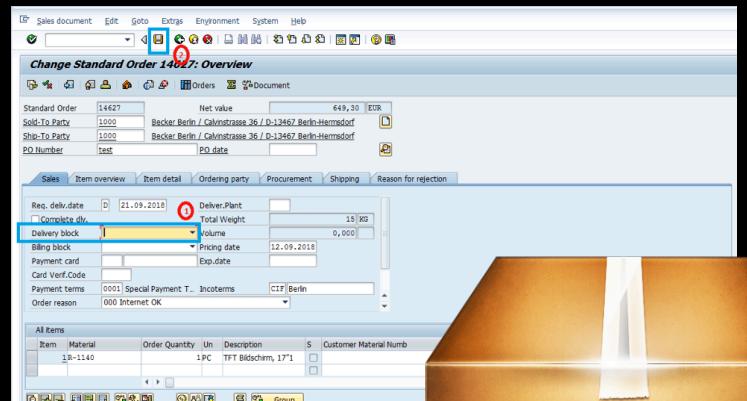
TTN

Device ID: EQ007648
analog_in_4: 4.2
temperature_5: 16.0
luminosity_6: 0

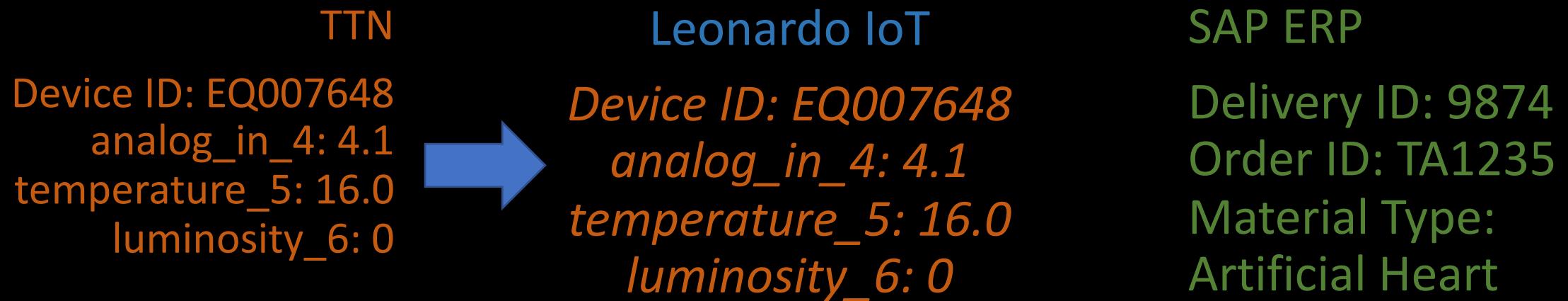


SAP ERP

Delivery ID: 9874
Order ID: TA1235
Material Type:
Artificial Heart



Step 2: TTN Node registered in SAP Leonardo IoT



Step 3: Digital Twin for Delivery is Created

TTN

Device ID: EQ007648
analog_in_4: 4.0
temperature_5: 16.0
luminosity_6: 0

Leonardo IoT

*Device ID: EQ007648
analog_in_4: 4.0
temperature_5: 16.0
luminosity_6: 0*

SAP ERP

Delivery ID: 9874
Order ID: TA1235
Material Type:
Artificial Heart



*Delivery ID: 9874
Order ID: TA1235
Material Type: Artificial Heart
battery null
temperature null
luminosity null*

Step 4: Delivery is mapped to Tracking Device

TTN

Device ID: EQ007648
analog_in_4: 3.9
temperature_5: 16.5
luminosity_6: 10

Leonardo IoT

*Device ID: EQ007648
analog_in_4: 3.9
temperature_5: 16.5
luminosity_6: 10*

SAP ERP

Delivery ID: 9874
Order ID: TA1235
Material Type:
Artificial Heart



mapping started January 31 9:15:12

*Delivery ID: 9874
Order ID: TA1235
Material Type: Artificial Heart
battery 3.9 (max 3.9)
temperature 16.5 (max 16.5)
luminosity 10 (max 10)*



Step 5: Tracking Device sends Data and Leonardo IoT monitors it in business context

TTN

Device ID: EQ007648
analog_in_4: 3.8
temperature_5: 32.0
luminosity_6: 10

Leonardo IoT

*Device ID: EQ007648
analog_in_4: 3.8
temperature_5: 32.0
luminosity_6: 10*

SAP ERP

Delivery ID: 9874
Order ID: TA1235
Material Type:
Artificial Heart

mapping started January 31 9:15:12

Delivery ID: 9874

Order ID: TA1235

Material Type: Artificial Heart

battery 3.8 (max 3.9)

temperature 32.0 (max 32.0)

luminosity 10 (max 10)



Step 6: Delivery is done, Mapping is removed (evtl. returns process and then Step 3)

TTN

Device ID: EQ007648
analog_in_4: 3.7
temperature_5: 18.0
luminosity_6: 10

Leonardo IoT

*Device ID: EQ007648
analog_in_4: 3.7
temperature_5: 18.0
luminosity_6: 10*

SAP ERP

Delivery ID: 9874
Order ID: TA1235
Material Type:
Artificial Heart



Delivery ID: 9874

Order ID: TA1235

Material Type: Artificial Heart

battery 3.7 (max 3.9)

temperature 18.0 (max 32.0)

luminosity 10 (max 10)



Data Mapping Overview (Master/Copy)

TTN Device	Leonardo IoT	SAP ERP
Device ID	<i>Device ID</i>	
analog_in_4	<i>analog_in_4</i>	Delivery ID
temperature_5	<i>temperature_5</i>	Order ID
luminosity_6	<i>luminosity_6</i>	Material Type

Mapping of Device to Delivery

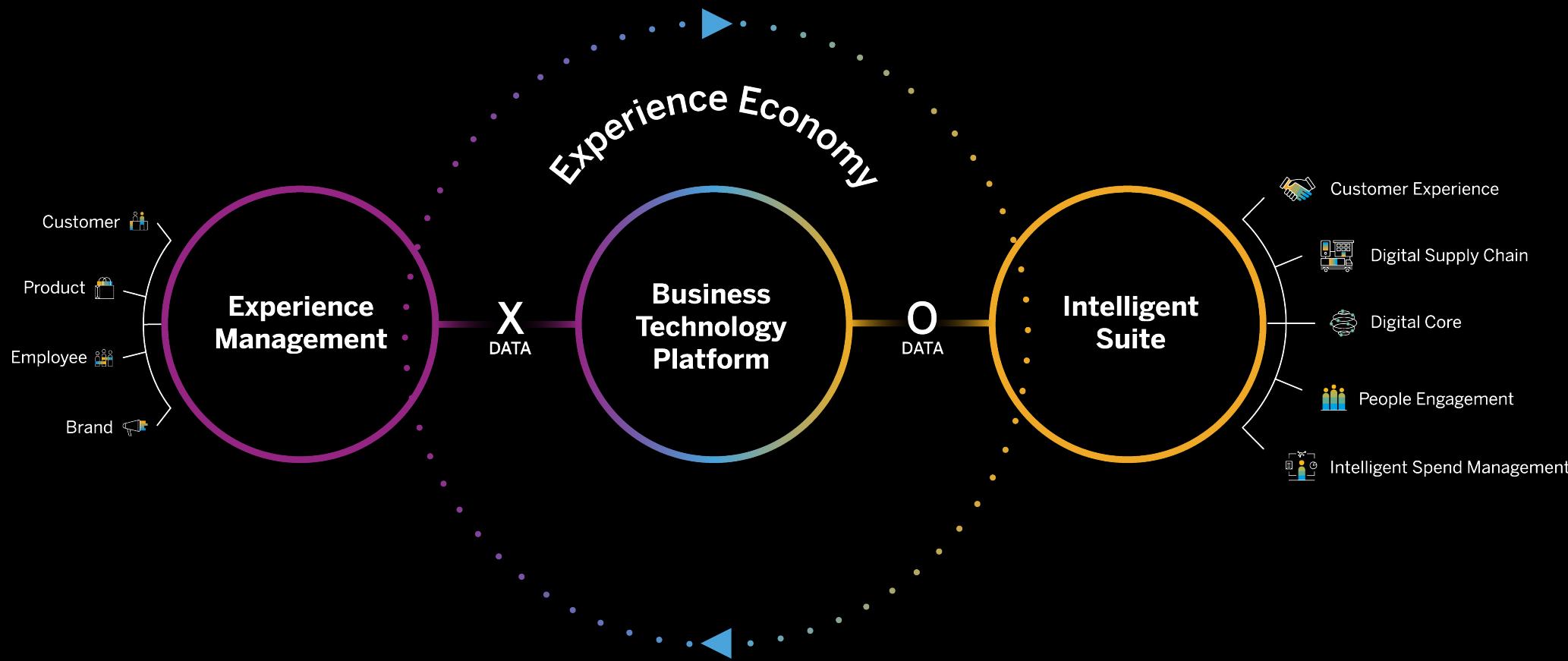
Delivery ID
Order ID
Material Type
battery (max, min, avg)
temperature (max, min, avg)
luminosity (max, min, avg)

Process for Delivery Tracking

1. No Integration, ERP and tracking device system are used independently
2. Tracking Device is onboarded in TTN, Device ID in TTN maps to logical device in SAP Leonardo IoT, device might also be registered in SAP ERP for maintenance as an Equipment
3. Delivery is scheduled in SAP ERP, Delivery is replicated into SAP Leonardo IoT to act as the „Digital Twin“
4. Digital Delivery is mapped to the tracking device in use
5. Device sends data, Leonardo IoT stores data and its rules check for threshold breach and evtl trigger issue to be addressed in ERP
6. Delivery is completed and mapping is removed

SAP's Products and SAP's IoT Platform

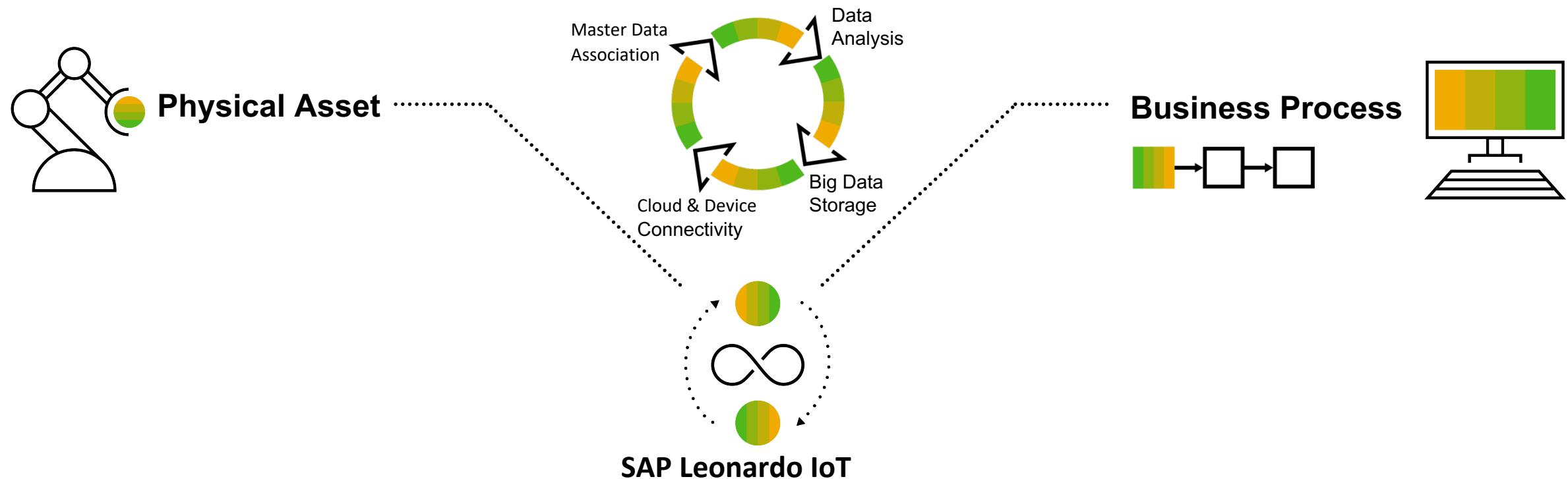
SAP: 400000 B2B customers/180 countries
100000 employees/140 countries - 27 billion € revenue



SAP Leonardo IoT – Turn signals into contextual data

Convert sensor information into business insight

SAP Leonardo IoT enables the harmonization and transformation of raw sensor data into business insights by associating it with business context and converting it into usable information



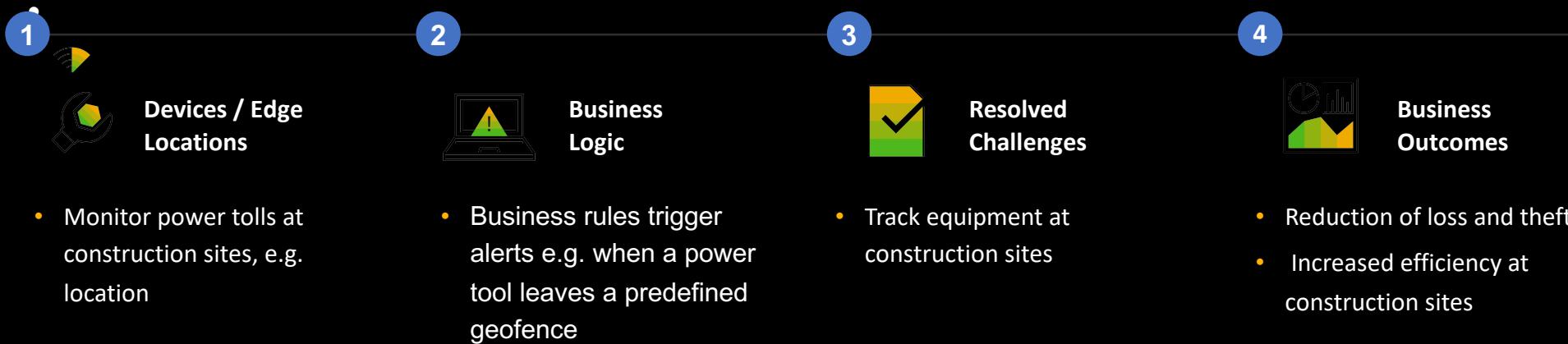
Customer Examples
(where the integration with The
Things Network would be
applicable)

Hilti - A Manufacturer of Power Tools

SAP Leonardo IoT Customer solves a billion dollar construction problem



- Based on SAP Leonardo IoT, Hilt developed an application to keep track of equipment at construction sites



Company Profile:

Industry: Manufacturer

Headquarter: Lichtenstein

Size: Large Enterprise

Solutions:

SAP Leonardo IoT

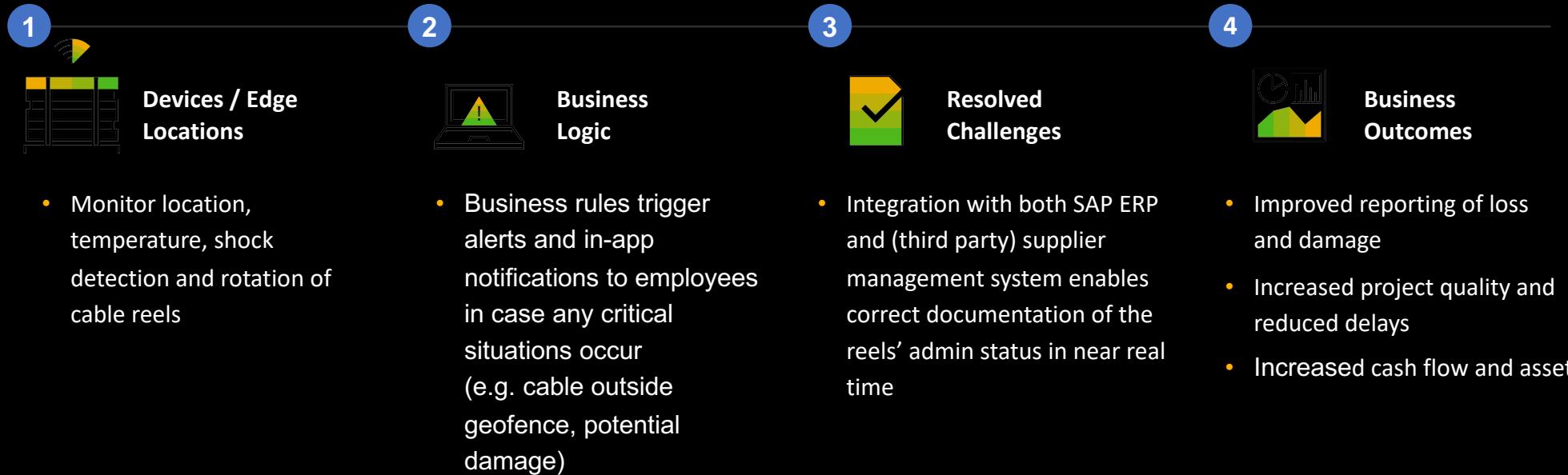
https://www.sap.com/about/customer-involvement/customer-stories/finder.html?sort=latest_desc&search=Hilti

Proximus - A Belgian Telecommunications Company

SAP Leonardo IoT Customer gaining insights into inventory



- Track cable reels from warehouse to installation site with an IoT sensor-based smart application



15% decrease in inventory level

2-3 years Anticipated ROI

https://www.sap.com/about/customer-involvement/customer-stories/finder.html?sort=latest_desc&search=Proximus

Company Profile:

Industry: Telco

Headquarter: Belgium

Size: Large Enterprise

Solutions:

SAP Leonardo IoT

SAP Fiori

SAP Cloud Platform

More Information

<https://github.com/SAP-samples/leonardo-iot-ttn-integration>

<https://community.sap.com/topics/internet-of-things>

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