

Imagine IoT

2.1 SAP and the Internet of Things



openSAP

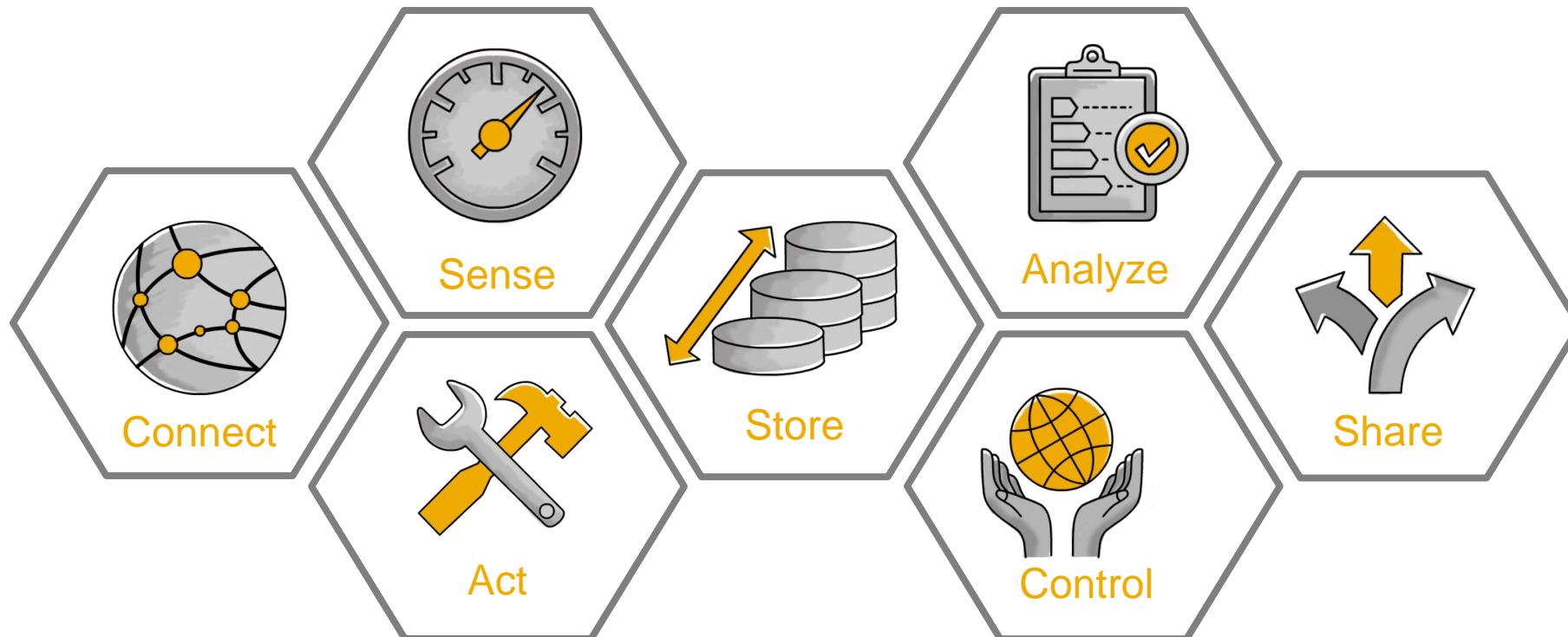
SAP and the Internet of Things

How and why is SAP involved?

SAP and the Internet of Things

openSAP definition refresher

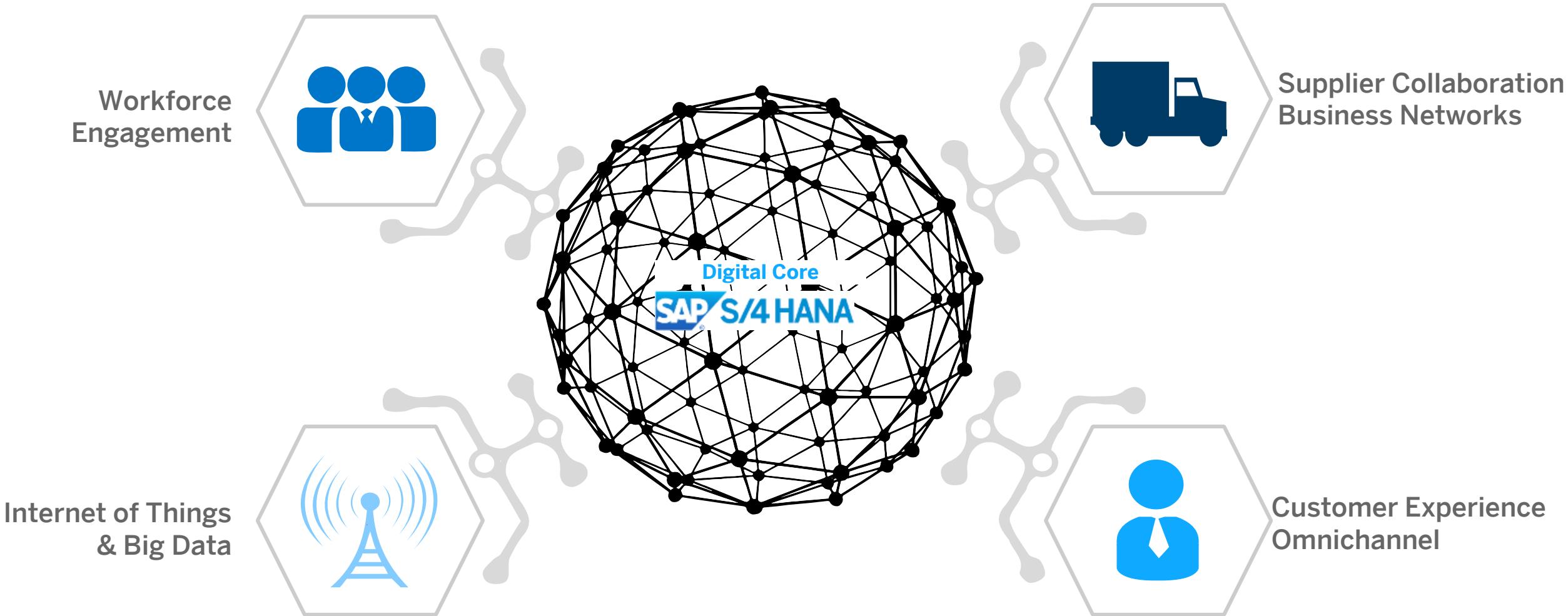
“The Internet of Things (IoT) is the **network of physical objects** that contain **embedded technology** to **sense** and **interact** with their environment and each other to collect and exchange data to **make our lives better**.”



IoT Definition by Gartner, Wikipedia, Digital Trends, and openSAP

SAP and the Internet of Things

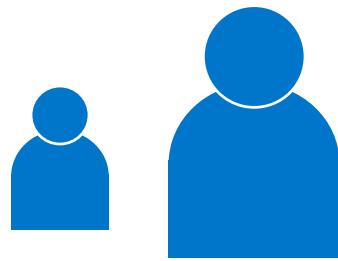
SAP strategy: connect the enterprise with the world



SAP and the Internet of Things

The world around us is driving business change

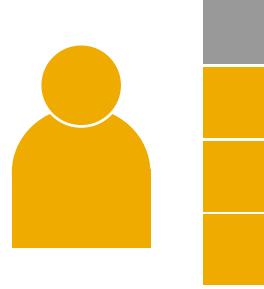
Middle class
rising



5 billion

people worldwide will become middle class

Young workforce



75 %

of global workforce will be millennials

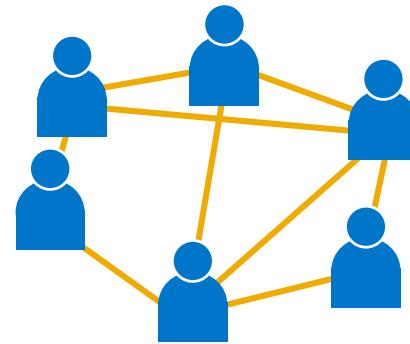
Resource pressure



50 %

of the world population will suffer water shortage

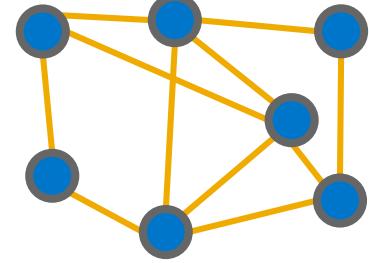
Networked people



1.3 billion

people in business and social networks today

Connected things



50 billion

devices in the Internet of Things by 2030

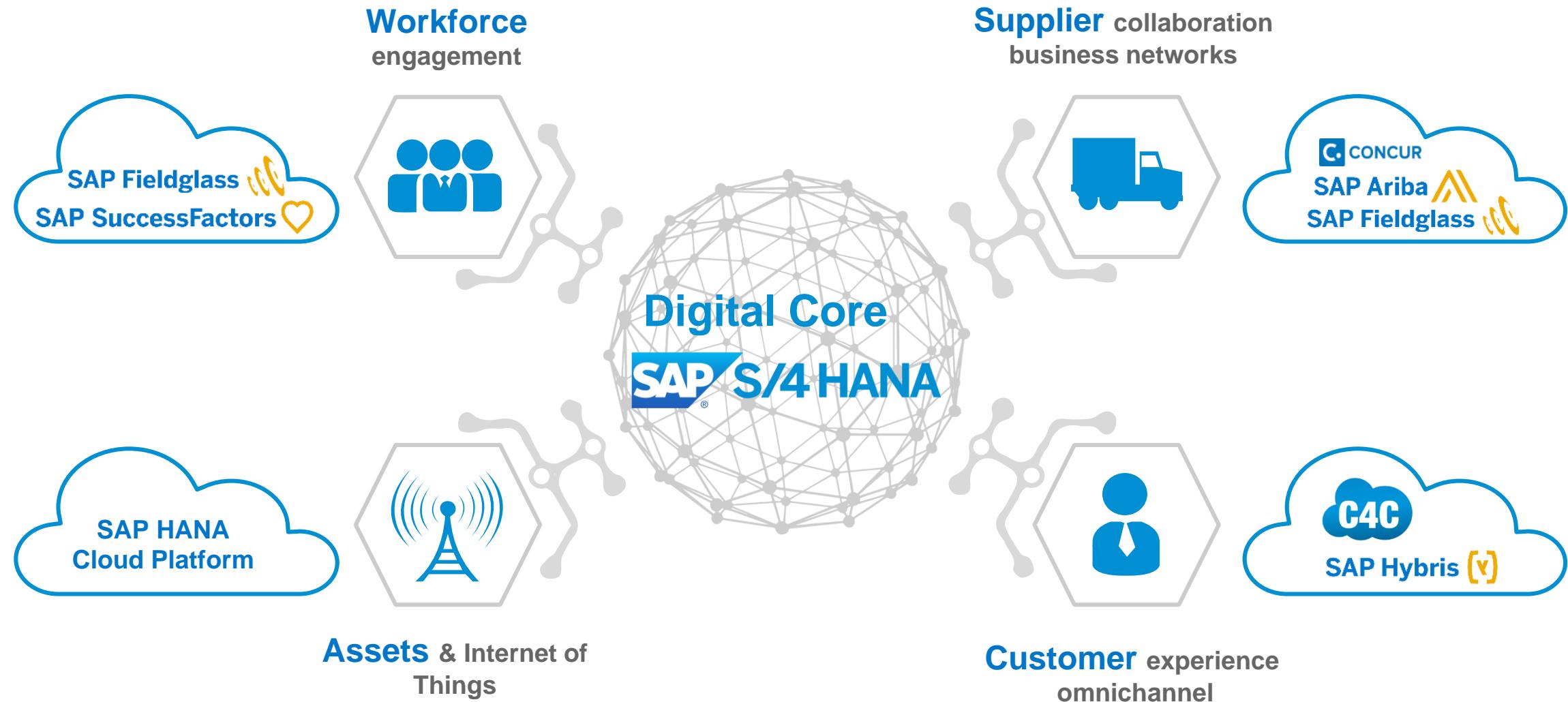
SAP and the Internet of Things

The Internet of Things is connecting everything and everyone



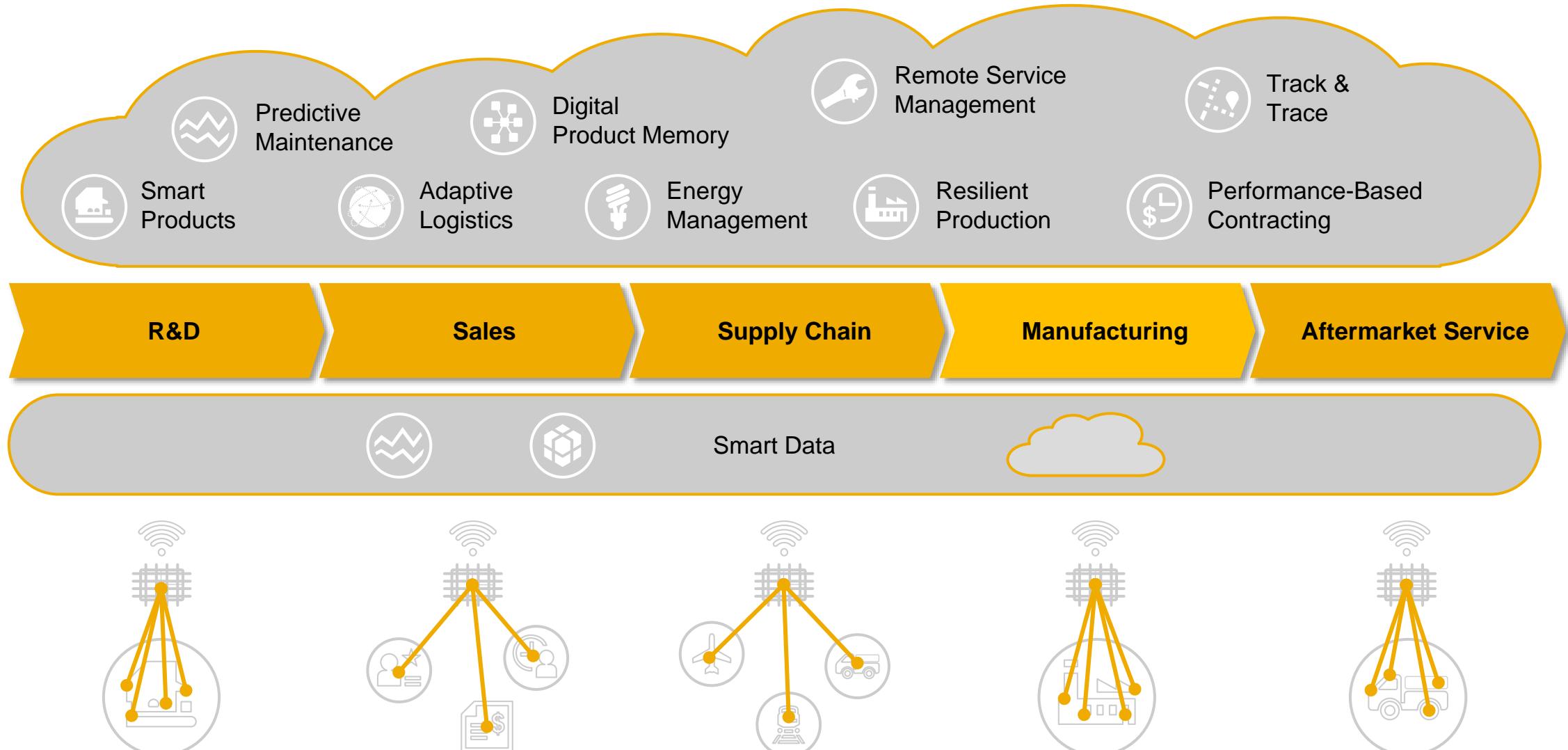
SAP and the Internet of Things

SAP strategy: connect the enterprise with the world



SAP and the Internet of Things

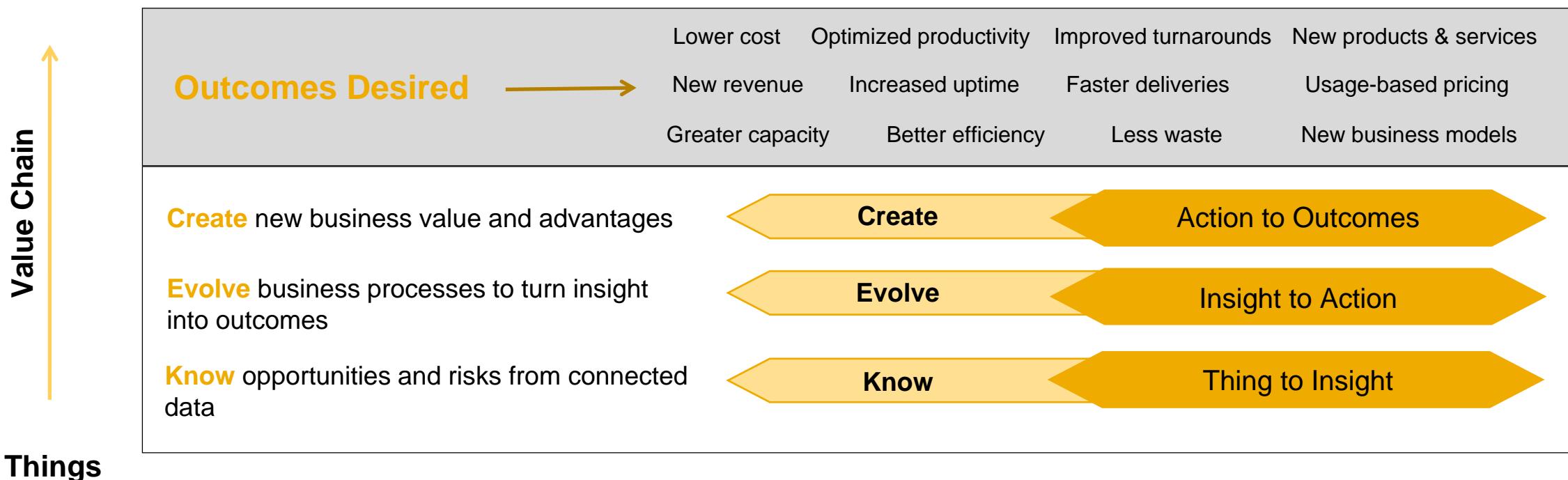
The Internet of Things is changing the enterprise value chain



SAP and the Internet of Things

Moving from “things” to outcomes

Outcomes



SAP and the Internet of Things

How SAP is connecting solutions across industries

Outcomes

Discrete Manufacturing

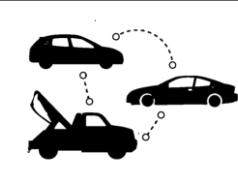


Connected Manufacturing

Transportation & Logistics

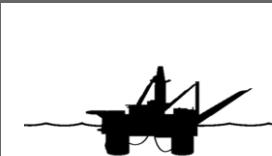


Connected Logistics



Connected Vehicles

Energy & Natural Resources



Connected Energy

Consumer Industries



Connected Consumer

Key Industries

Applications

Powered by
SAP HANA

Tech Partners

Predictive Maintenance and Service / Asset Intelligence Network

SAP HANA Platform

SIEMENS

T-Systems

OSIsoft® ROLTA

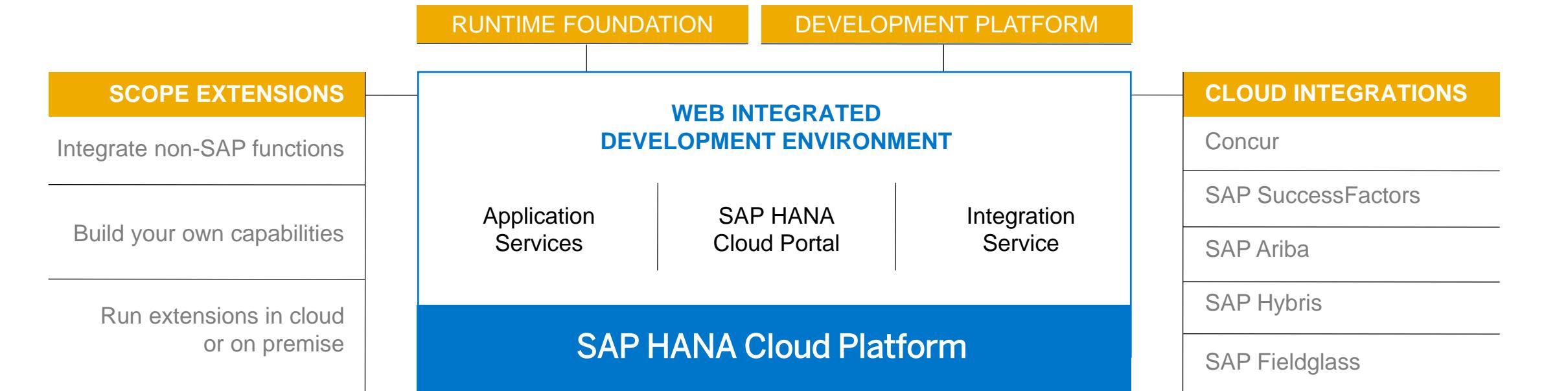


vodafone

Things

SAP and the Internet of Things

SAP HANA Cloud Platform and the Internet of Things



SAP S/4HANA



On Premise



Cloud



Hybrid

SAP and the Internet of Things

Drivers and challenges overview

Drivers

 Sensors built in / intelligent things	 Ubiquitous connectivity	 Unlimited data storage at low cost	 Cloud scalability, elasticity, availability	 IoT for everyone
Price of sensor and local computing power has drastically come down	Proliferation of mobile networks and evolution of low energy wireless; 5G to natively support IoT	Amazon AWS offerings provide storage from 20€ per TB, open source standard stores	Cloud offerings are designed for scalability, high availability, and elasticity	Millions of developers can easily “play” with IoT – at home, at startups

Challenges

 Heterogeneous devices standards	 Scenario-specific algorithms	 Many market players	 Security, safety, privacy concerns	 Lack of skills
Large variety of proprietary interfaces, protocols, and data formats	Customer landscapes for IoT applications have little commonality, requiring data scientists	Customers face offerings from different parts of the stack; most vendors only address parts	Heterogeneity of attack points with lack of end-to-end standards	Expensive specialists for data intake, data scientists, security experts

SAP and the Internet of Things

Big picture: why involve SAP for the Internet of Things?

Leading business process integration

Seamless integration of IoT data with business processes and insight-driven actions.

An unmatched breadth of industry experience

The value of IoT is industry-specific and SAP has the industry experience to help maximum outcomes across the entire ecosystem.

A powerful, scalable digital core

Our powerful digital core, loaded with SAP HANA, is built for the huge scale of IoT data.

Customized, best-in-class services

Unlocking the power and value of IoT comes from our ability to totally customize and integrate our solutions.

Our commitment to outcomes

End-to-end solutions that focus on outcomes and business value.

Equipment-independent non-industry player

SAP can offer IoT solutions in the heterogeneous asset market as a non-industry player. Being independent of the physical assets sales, SAP can work with all the major machine manufacturers and connect their products into an overall SAP IoT solution.

SAP and the Internet of Things

Unit summary and looking ahead

Unit Summary



Looking Ahead



SAP is here to help you:

- Run simple
 - Move from “things” to outcomes
 - Build, integrate, and/or extend your own IoT applications
-

- Sensors, the cloud, and the Internet of Things



Thank you

Contact information:

open@sap.com

openSAP

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Imagine IoT

2.2 Sensors, the Cloud, and the Internet of Things



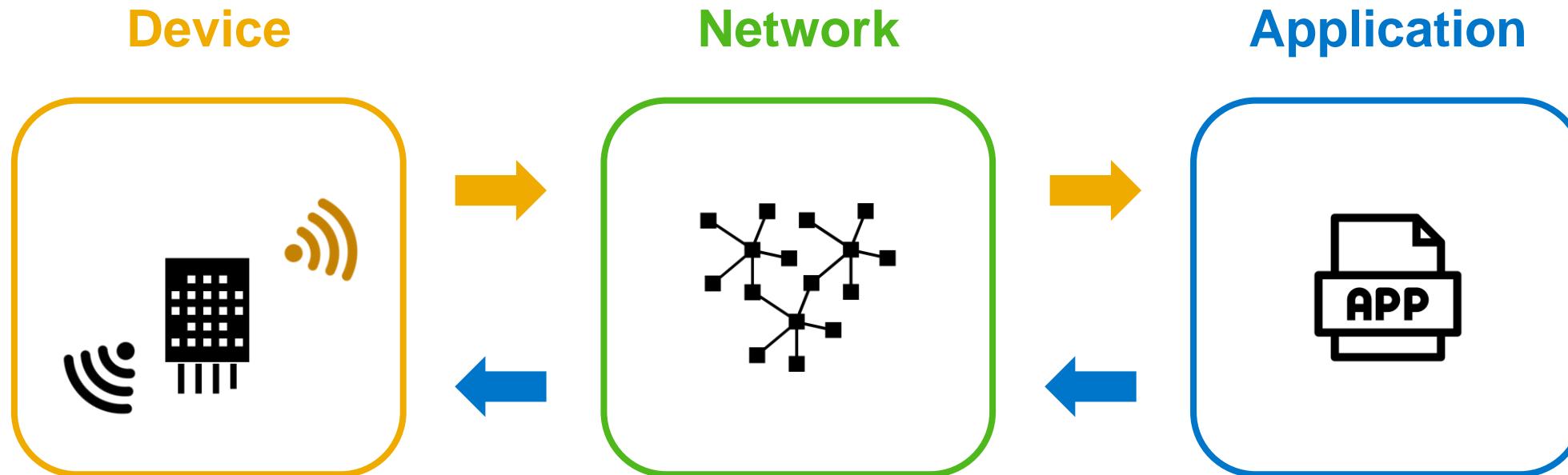
openSAP

Sensors, the cloud, and the Internet of Things

The big picture

Sensors, the Cloud, and the Internet of Things

Building blocks of IoT

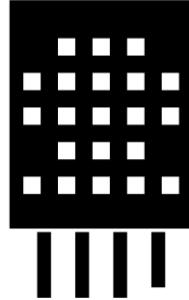


Sensors

An important element of IoT

Sensors, the Cloud, and the Internet of Things

What is a sensor?



A **sensor** is a small device that **identifies information** from its physical surroundings.



If the sensor **detects a change** in the environment, it **generates a corresponding action**.

Sensors, the Cloud, and the Internet of Things

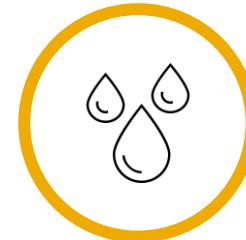
Sensor measurement examples



Sound



Position



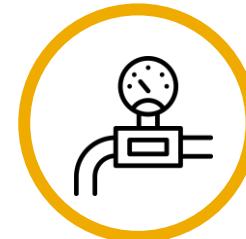
Humidity



Chemicals



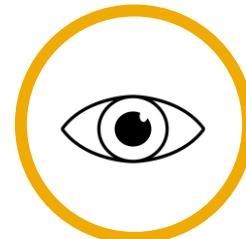
Motion



Pressure



Electricity



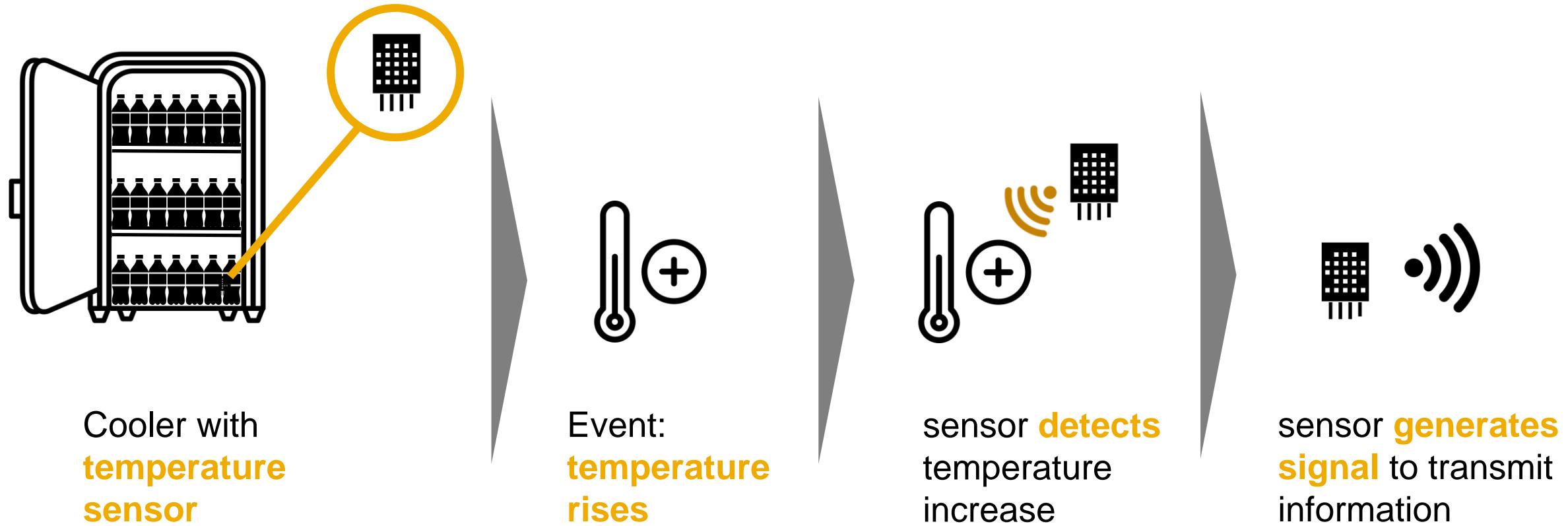
Vision



Temperature

Sensors, the Cloud, and the Internet of Things

Sensors in action – example: temperature sensor

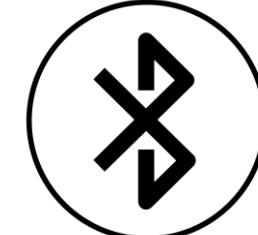


Sensors, the Cloud, and the Internet of Things

A look at different types of sensor technologies



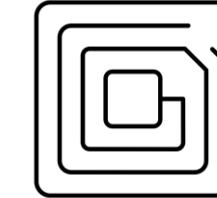
Wi-Fi



Bluetooth



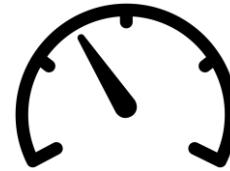
Camera



RFID

Sensors, the Cloud, and the Internet of Things

The growing importance of sensors



Experts predict there will be up to **100 trillion** sensors by 2030.

Image, speech, and voice recognition will advance to near **100% accuracy** by 2025.

The speed of analytics will grow **thirty-fold by 2030**, with 95% of queries answered in milliseconds.

Sensors will be commonplace in the 111 million new cars and the **2 billion smartphones** that will be purchased in 2020.

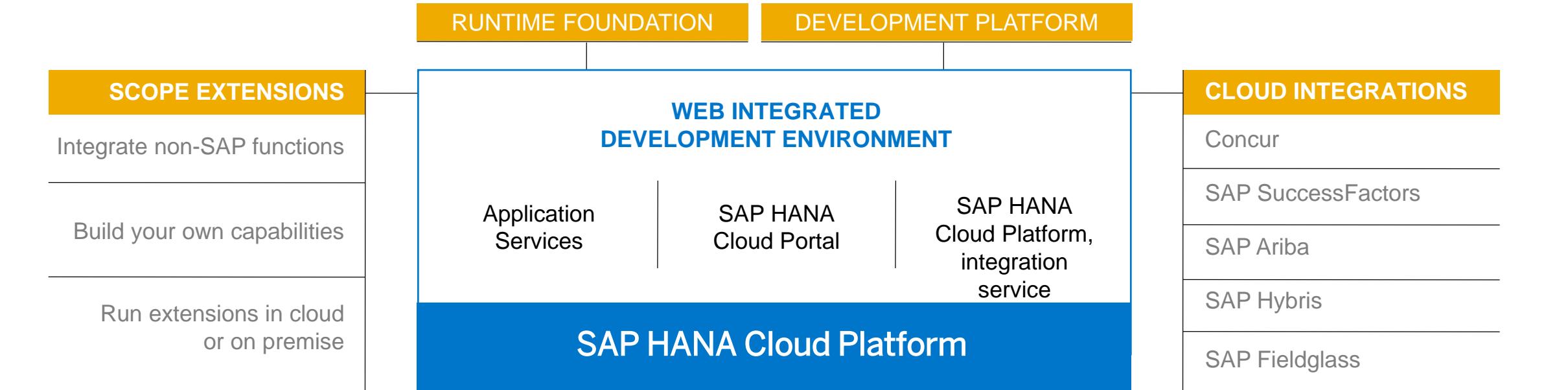
The Internet of Everything market could grow to **\$14.4 trillion** by 2022.

SAP HANA Cloud Platform

Enabling IoT

Sensors, the Cloud, and the Internet of Things

Review: SAP HANA Cloud Platform



SAP S/4HANA



On Premise



Cloud



Hybrid

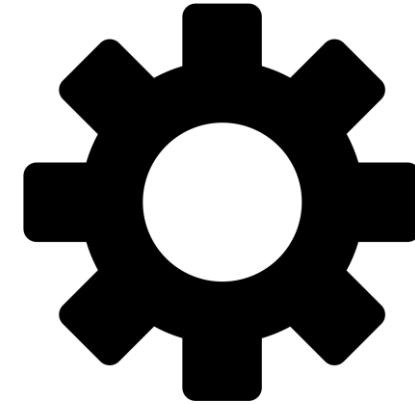
Sensors, the Cloud, and the Internet of Things

Difference between cloud computing and edge processing



Cloud Computing

Providing data storage and processing on a network of remote servers

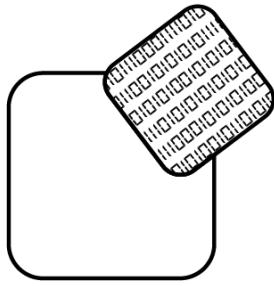


Edge Processing

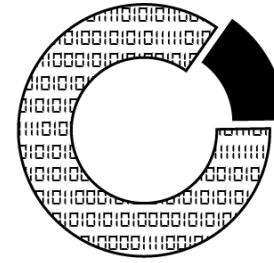
Data processing locally in a device at the edge of the network

Sensors, the Cloud, and the Internet of Things

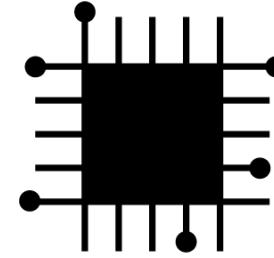
Why edge computing?



40% of IoT-created data will be stored, processed, analyzed, and acted upon close to or at the edge of the network.



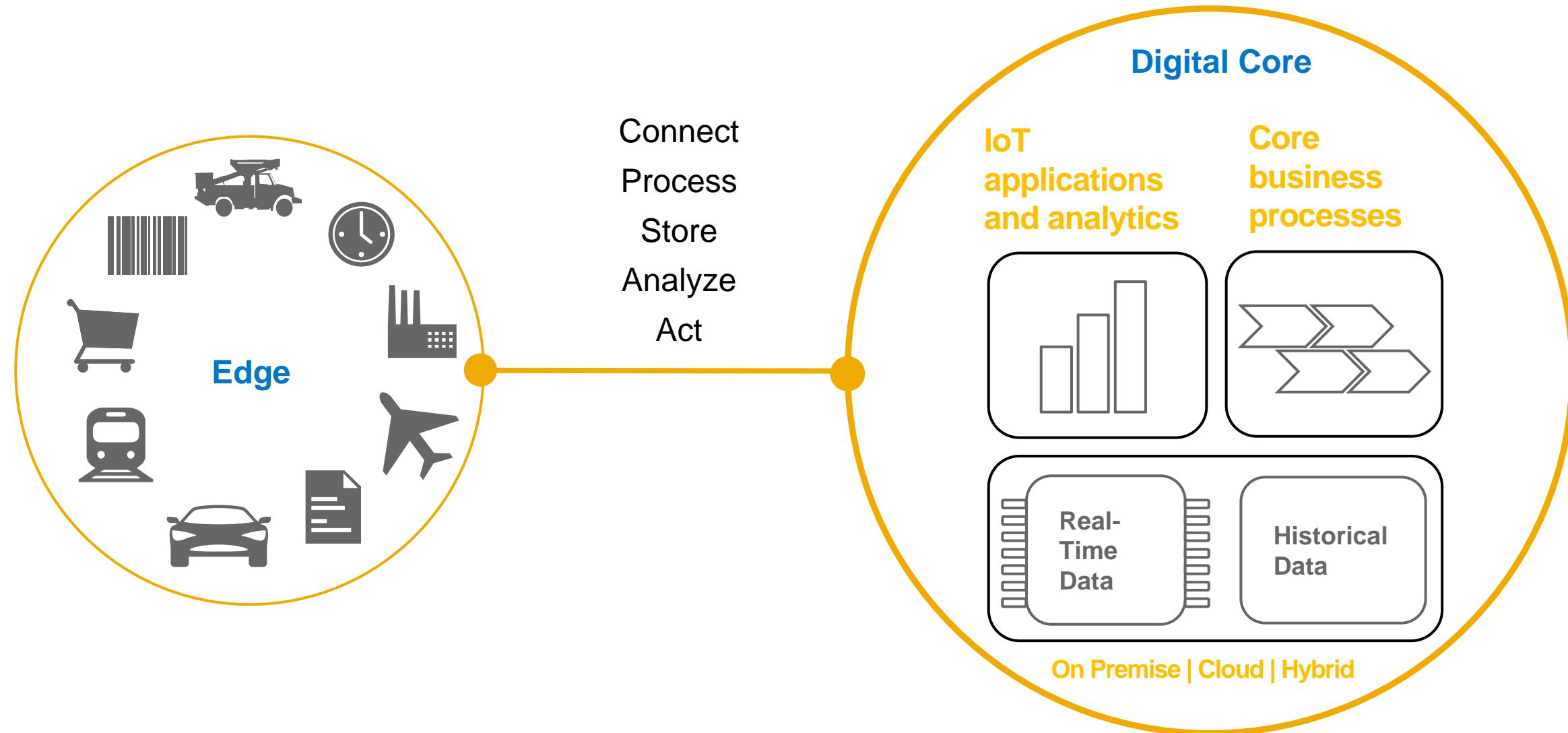
Only **15%** of IoT data acquired is meaningful even after analysis.



The average cost of uploading 1 petabyte to a typical cloud service is **\$100,000**.
(For example, a large industrial manufacturer can process more than 5 billion sensor readings per second.)

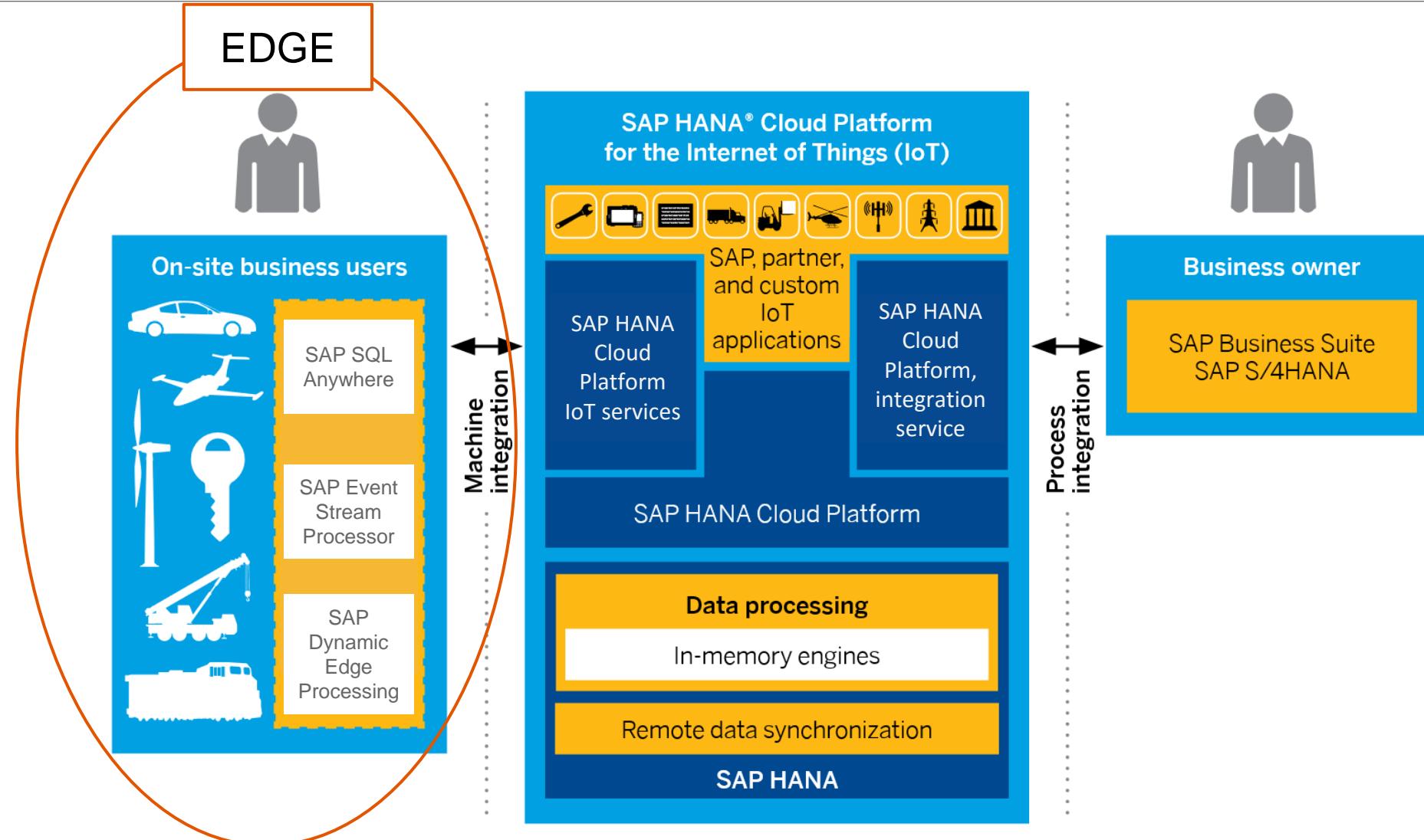
Sensors, the Cloud, and the Internet of Things

What is edge computing?



Sensors, the Cloud, and the Internet of Things

SAP HANA Cloud Platform for the Internet of Things





Thank you

Contact information:

open@sap.com

openSAP

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Imagine IoT

2.3 SAP Connected Goods



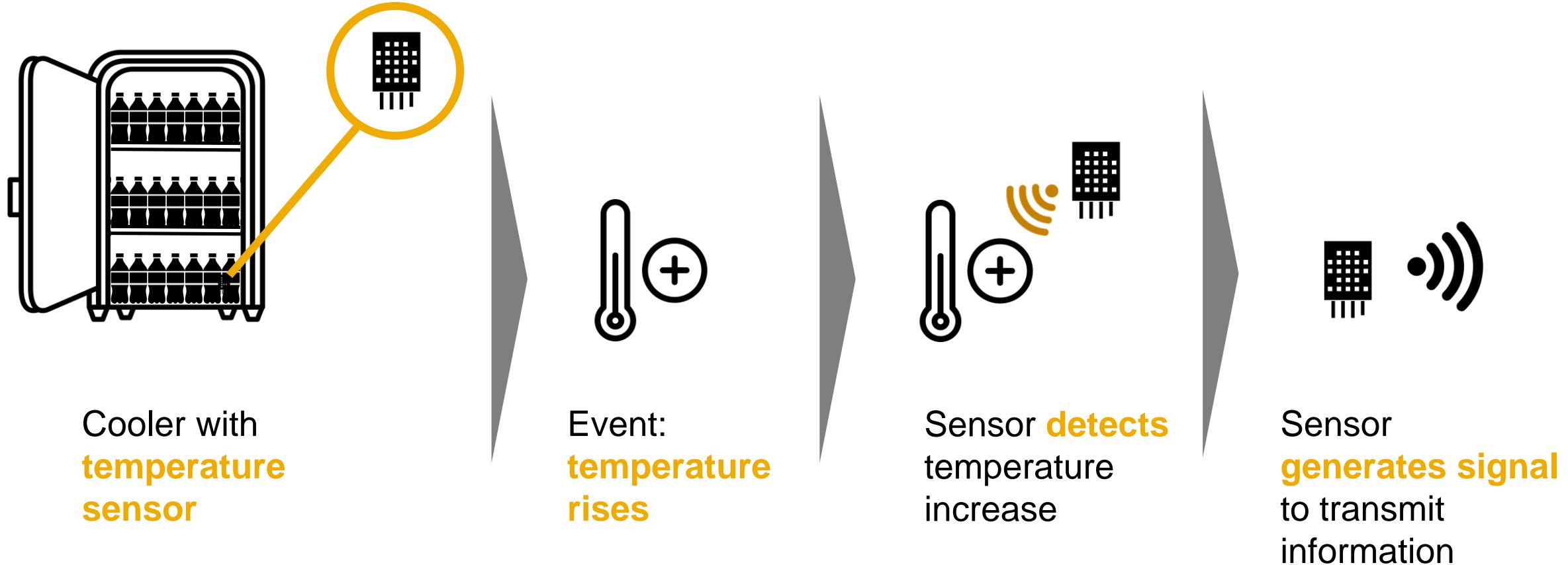
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SAP Connected Goods

An IoT use case example

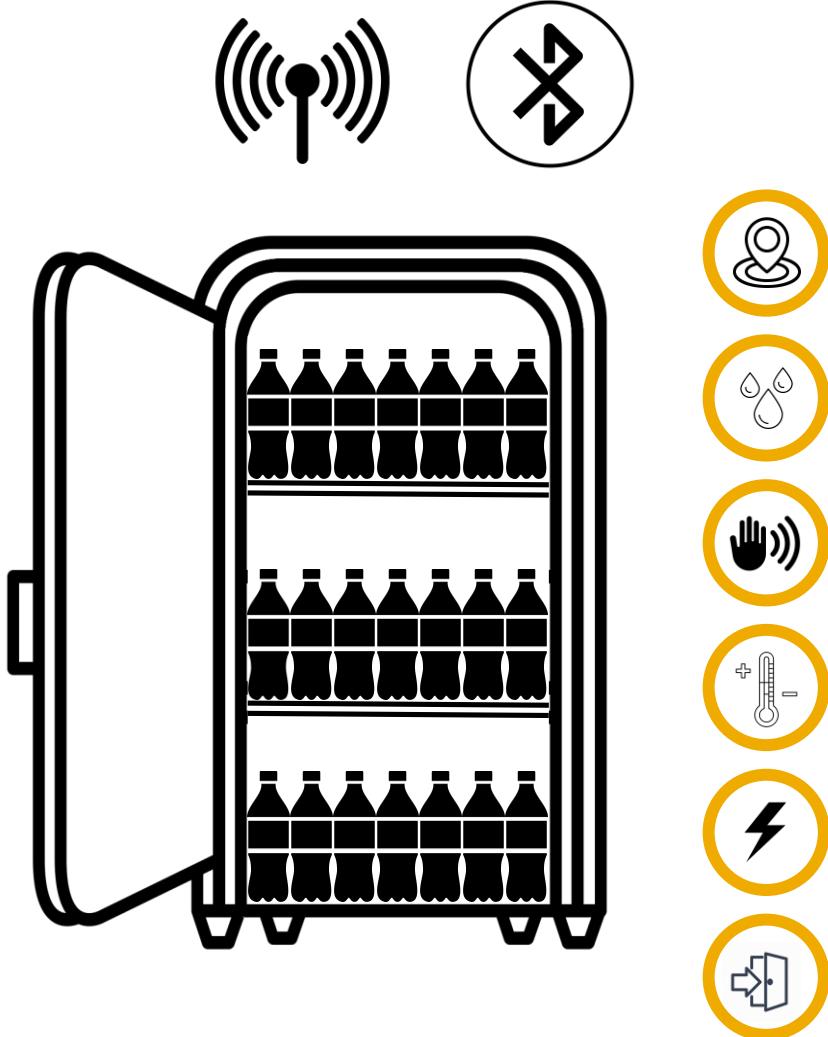
SAP Connected Goods

Sensors in action – industrial cooler example



SAP Connected Goods

The smart industrial cooler



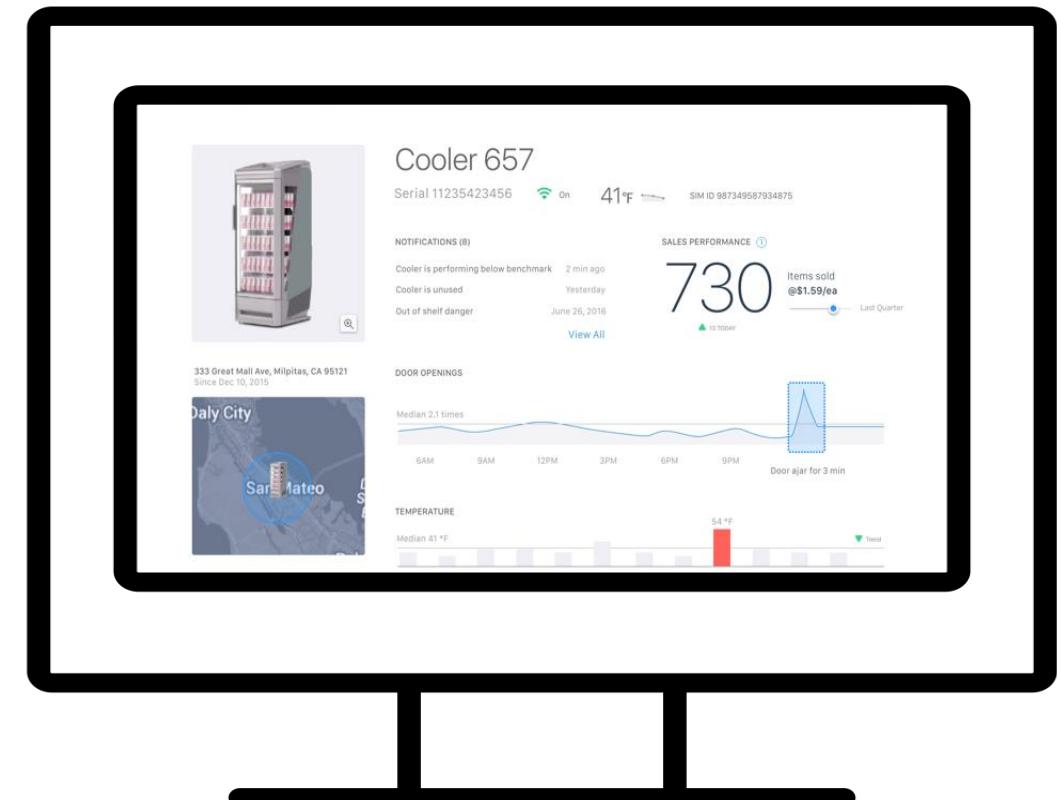
- Millions of **unmonitored** assets worth billions of dollars are located in various outlets:
 - *Retail stores*
 - *Gas stations*
 - *Pharmacies*
- Stock may need to be maintained at specific temperature and humidity
- Devices are often underutilized, stocked-out, powered off, or missing
- **No insight** on device performance or revenue recognition per device
- Device health and location are audited by human agents once every **few months**

SAP Connected Goods

Goal

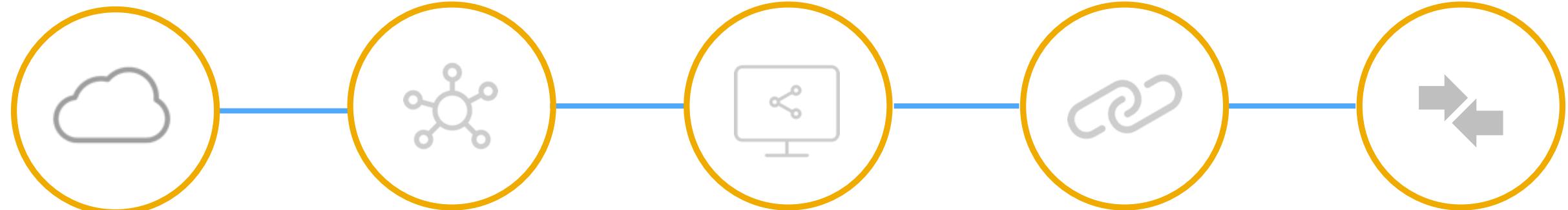
- Monitor and manage **large number of customer-facing devices** such as coolers, chillers, vending machines
- Reduce operational costs and **increase revenues** by optimizing **asset availability** and utilization
- Improve **customer satisfaction** by ensuring correct **storage conditions** of perishable goods
- Turn an appliance or product container into a **sales and marketing platform**
- Based on **SAP robust cloud infrastructure** and SAP HANA database

Lab Preview*



SAP Connected Goods

Goal



System Setup

Configuration and system setup required prior to connecting smart devices to SAP Connected Goods cloud solution

- Device types definition
- User role settings
- Connectivity setup
- User authorization
- UI customization

Onboarding

The initial process in which a “device” is registered in SAP Connected Goods for the first time to become a monitored “thing”

- Manual onboarding
- Automatic onboarding
- Master data matching
- Location validation

Monitoring

Any activity that provides technical and business insight on “things” that were onboarded to SAP Connected Goods

- Asset map overview
- Device object view
- Analysis rules definition
- Alert monitoring
- Usage reports/trends

Take Action

Any activity that results as a direct reaction to insight gained during monitoring of onboarded “things” with SAP Connected Goods

- E-mail notifications
- Push notifications
- Business object creation

Operate

Any activity that can be remotely performed or triggered on a “thing” that is connected to SAP Connected Goods

- Remote control
- Pull data from device
- Find my device

SAP Connected Goods

User personas



Administrator

Responsible for the daily operation, administration, and configuration of the Connected Goods landscape

- Device Preparation
- System Preparation
- Master Data Prep.
- Default Rules Creation
- Connectivity Settings
- User Authorization
- Back-End Integration
- Payment Server integration
- UI Customization
- On/Offboarding



Regional Sales Manager

Responsible for the ongoing revenue-generating activities, with key accounts that host "things"

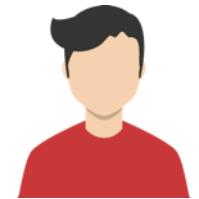
- Default Rules Creation
- Device Geo-Matching
- Simple/Alert Overview
- Map Overview
- Detail Device View
- Define Rules
- Define Notifications
- Create Business Objects
- View Reports
- On/Offboarding



Distribution Partner Manager

Responsible for the overall distribution activities of "things" and products that goes into the "things"

- Simple/Alert Overview
- Map Overview
- Detail Device View
- Inventory/Stock View
- Planogram View
- Visit Plan View
- Define Rules
- Define Notifications
- Create Business Objects
- View Reports



Field Service Technician

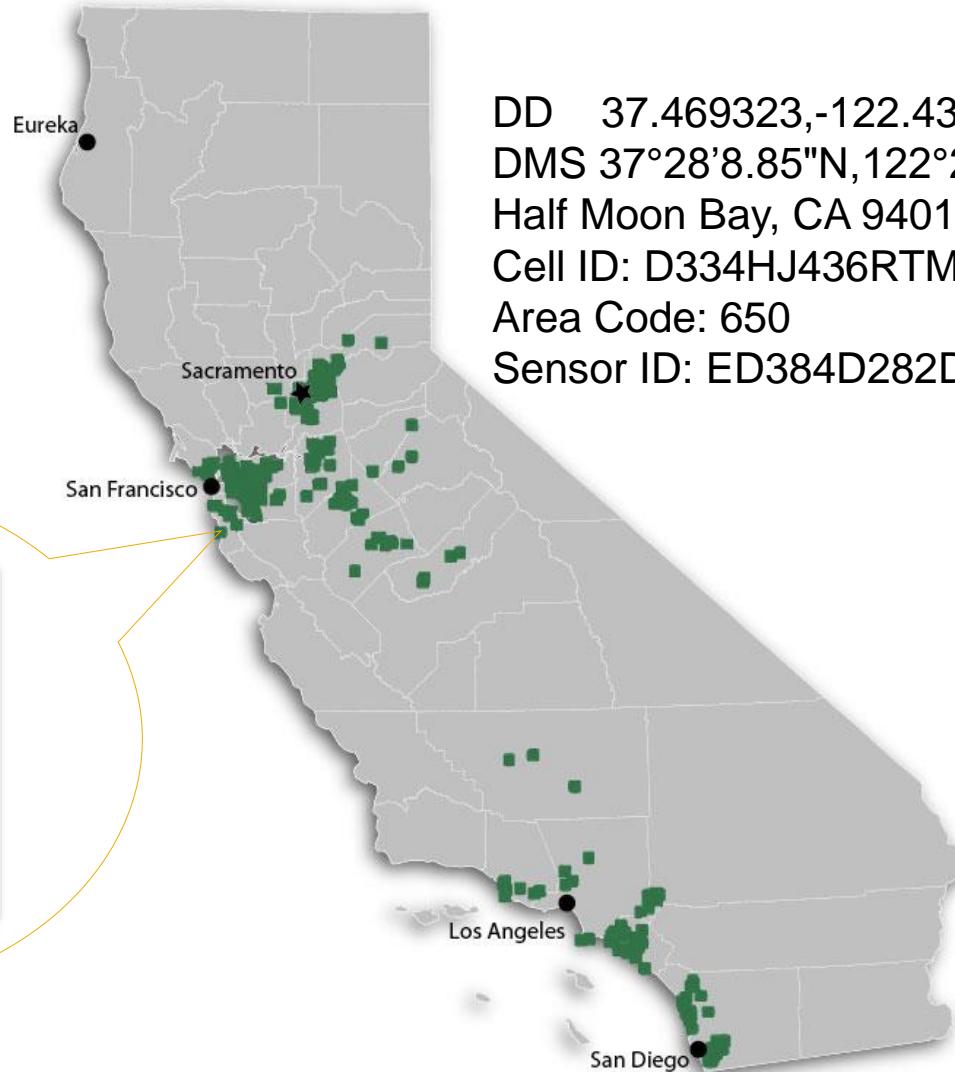
Responsible for repair, maintenance, and responding to service requests for "things" in the field

- Onboarding
- Offboarding
- Pull Data from Device
- Find My Device

SAP Connected Goods

Data matching

Serial No: 0017A47788
Type: UCBEV500
ID: D282D3AA695696
Firmware Ver: 7.031
Temperature: 5°C
Humidity: 78%
Door: Off



DD 37.469323,-122.436206
DMS 37°28'8.85"N,122°26'10.30"W
Half Moon Bay, CA 94019
Cell ID: D334HJ436RTM
Area Code: 650
Sensor ID: ED384D282D3AA

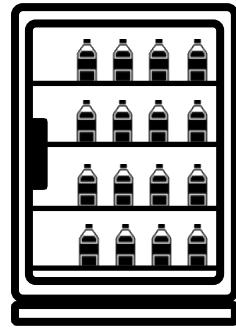
CRM Territory Hierarchy:
Sales Org: USA / West / CA / NorCal
Distribution Channel: Retail
Division: Beverages
Key Account: Safeway-Albertson
Customer: Safeway, Half Moon Bay
No of Coolers: 3
Account Manager: Laura Davis

Supply:
Sales Rep: Andrew Lewton
Supply Mode: Direct Store Delivery
Distributor: Davis Beverage Group

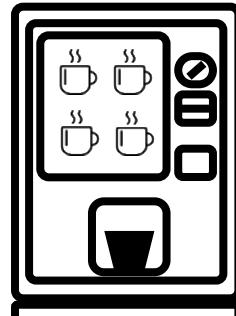
Support:
NorCAL Cooler Repair Company

SAP Connected Goods

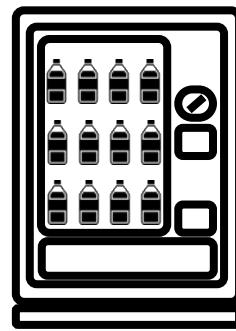
How it all works together



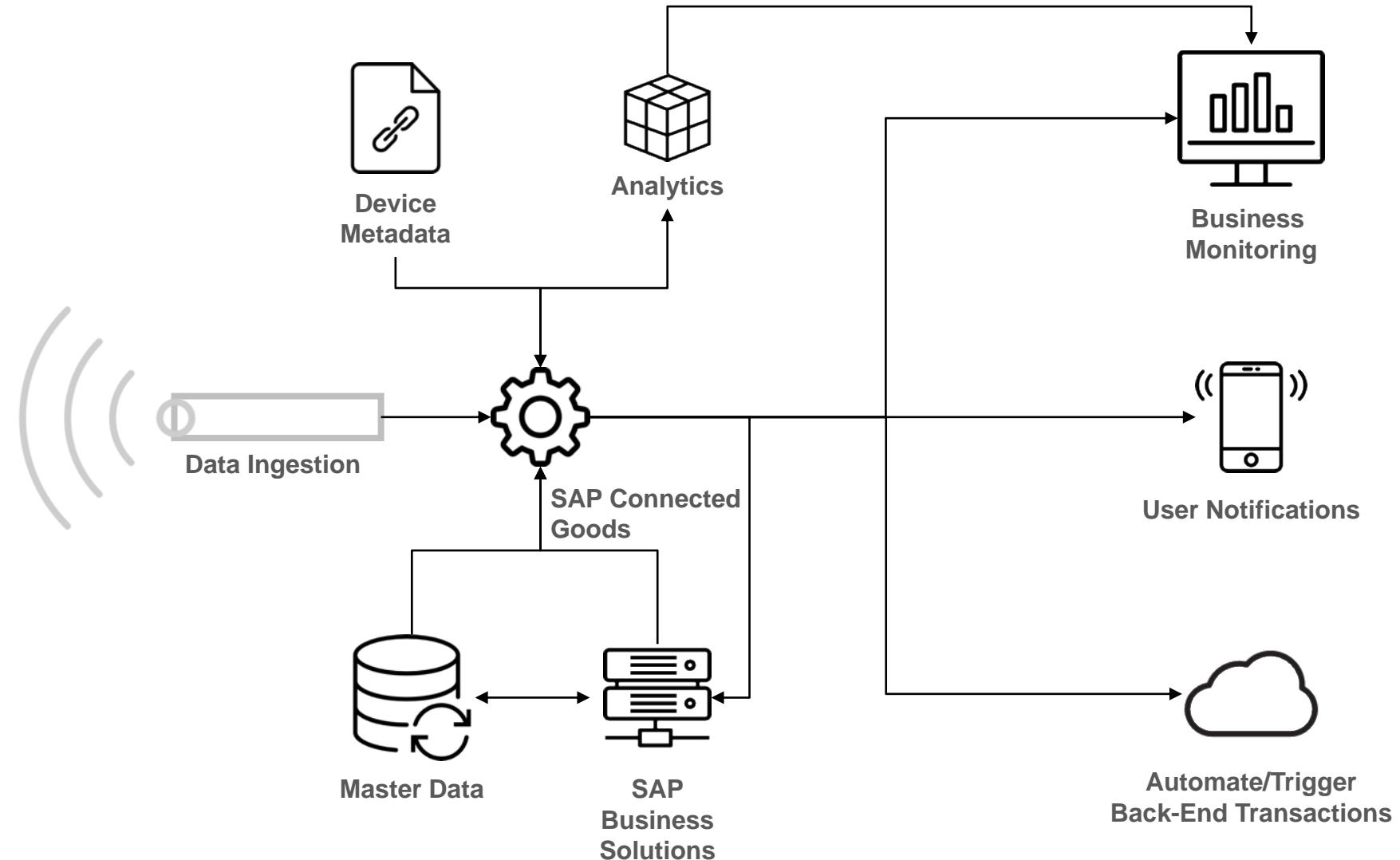
Coolers



Coffee

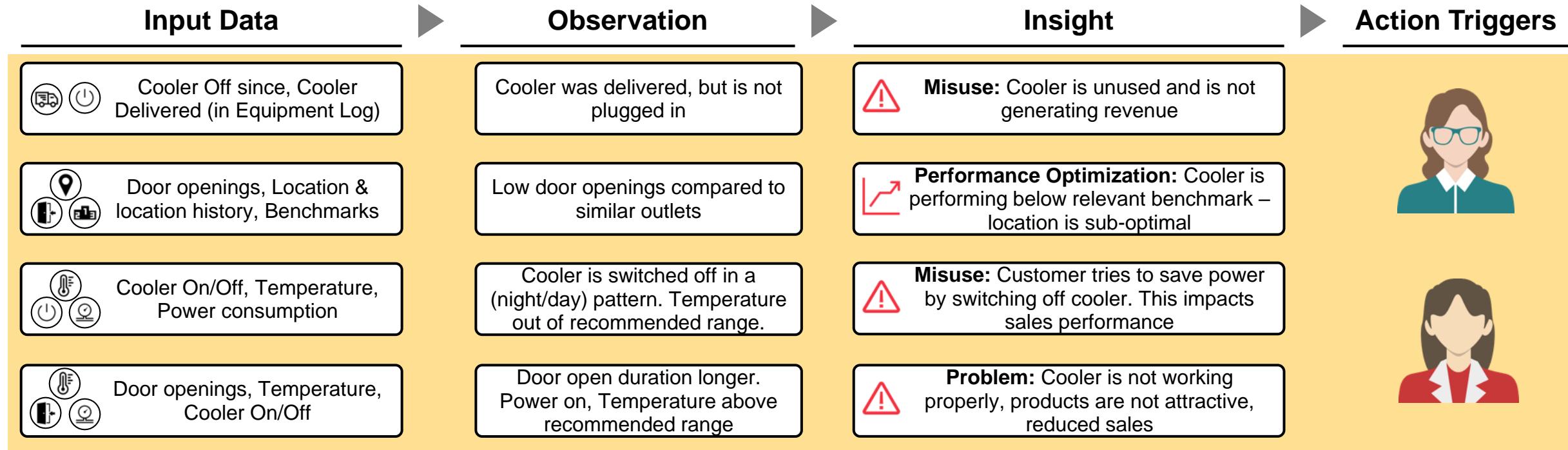


Vending



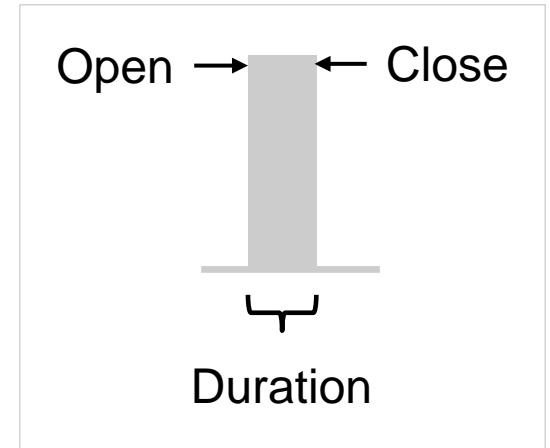
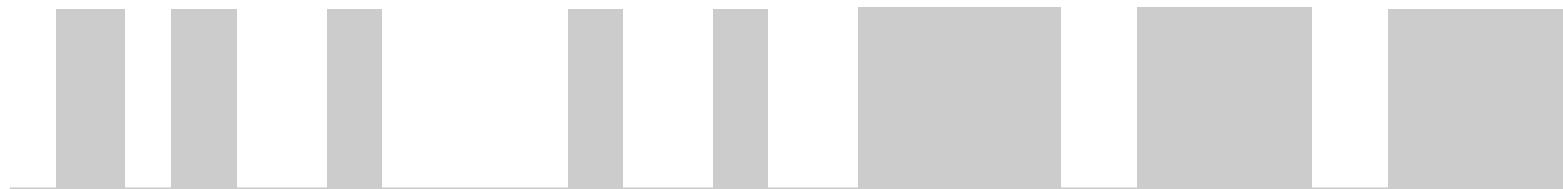
SAP Connected Goods

Actionable insight



SAP Connected Goods

Door opening patterns

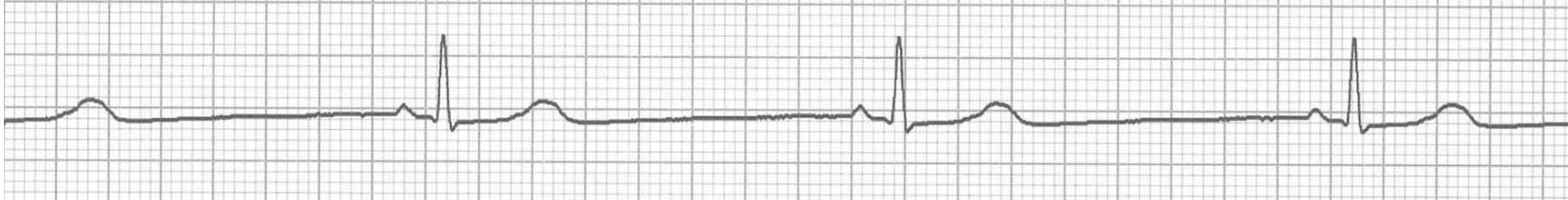


SAP Connected Goods

Door opening patterns



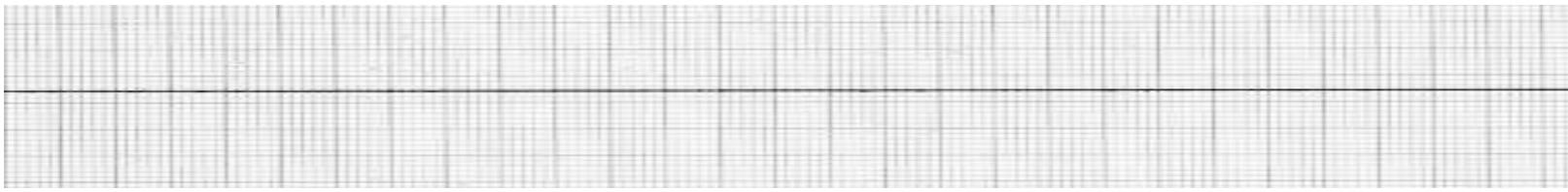
Normal HR



Slow HR



Abnormal Conduction



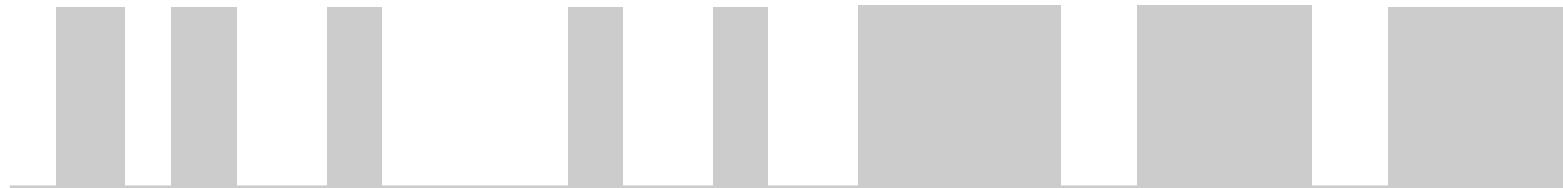
No Activity

SAP Connected Goods

Door opening patterns



Normal Pattern



Missing SKU



Wrong Products

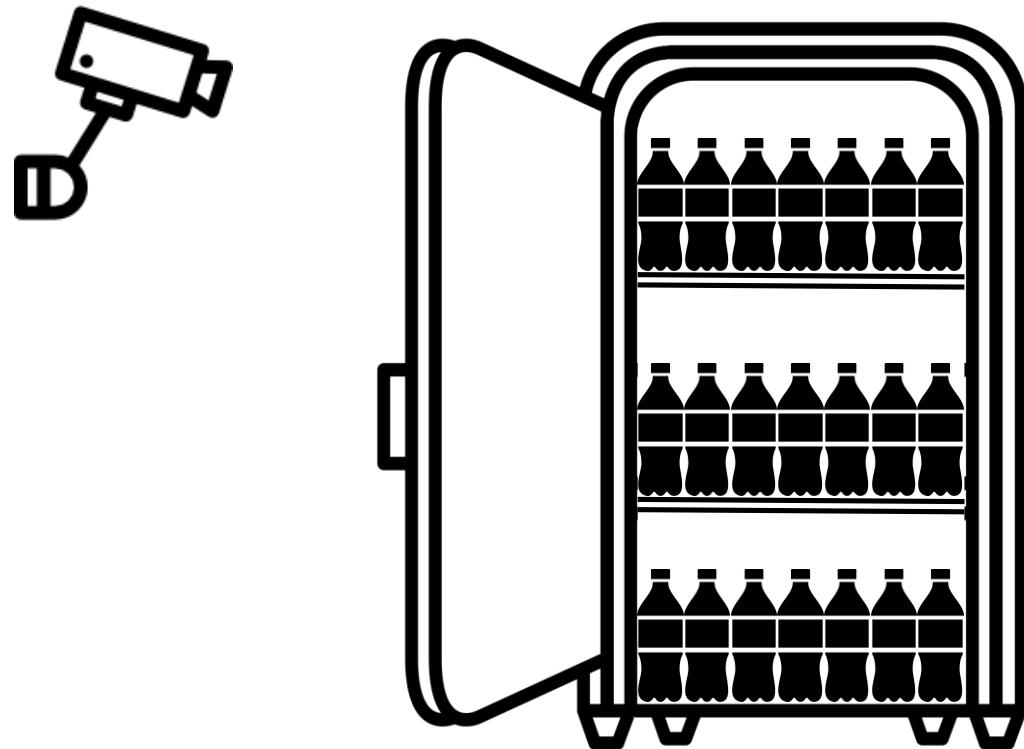


No Access

SAP Connected Goods

Door opening context

A cooler door will not open by itself



Can we monitor if people are present around the device?



Thank you

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open@sap.com

openSAP

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Imagine IoT

2.4 SAP IoT Tools and Resources



openSAP

SAP Tools and Resources

Getting Started

**Knowing is half
the battle**

Choosing the right tool or technology is one important step. Understanding what tools and resources are out there can simplify the ideation process.



Tools & Resources

Which ones are relevant for IoT?

SAP Tools and Resources

IoT Revolution and SAP

SAP IoT Homepage

<http://go.sap.com/solution/internet-of-things.html>

White Paper Hyperlink

IoT Digital Transformation



SAP Tools and Resources

SAP Community Network (SCN)

SAP IoT Solutions

<http://scn.sap.com/community/internet-of-things>

The screenshot shows the SAP Community Network interface. At the top, there's a navigation bar with links for 'Getting Started', 'Newsletters', 'Store', 'Log On', and 'Join Us'. A search bar is also present. Below the navigation, there are several main menu categories: 'Products', 'Industries', 'Lines of Business', 'Services & Support', 'Training & Education', 'University Alliances', 'About SCN', 'Partnership', 'Events & Webinars', 'Downloads', 'Developer Center', 'Innovation', 'Activity', 'Communications', and 'Actions'. A 'Browse' dropdown is also available. The main content area features a section titled 'SAP Solutions for the Internet of Things' with a sub-section 'from Things to Outcomes'. It includes a video thumbnail of a woman smiling, a text snippet about SAP's 40-year history in business transformation, and a link to 'The SCN Rules of Engagement'.

IoT Blog

<http://scn.sap.com/community/internet-of-things/blog>

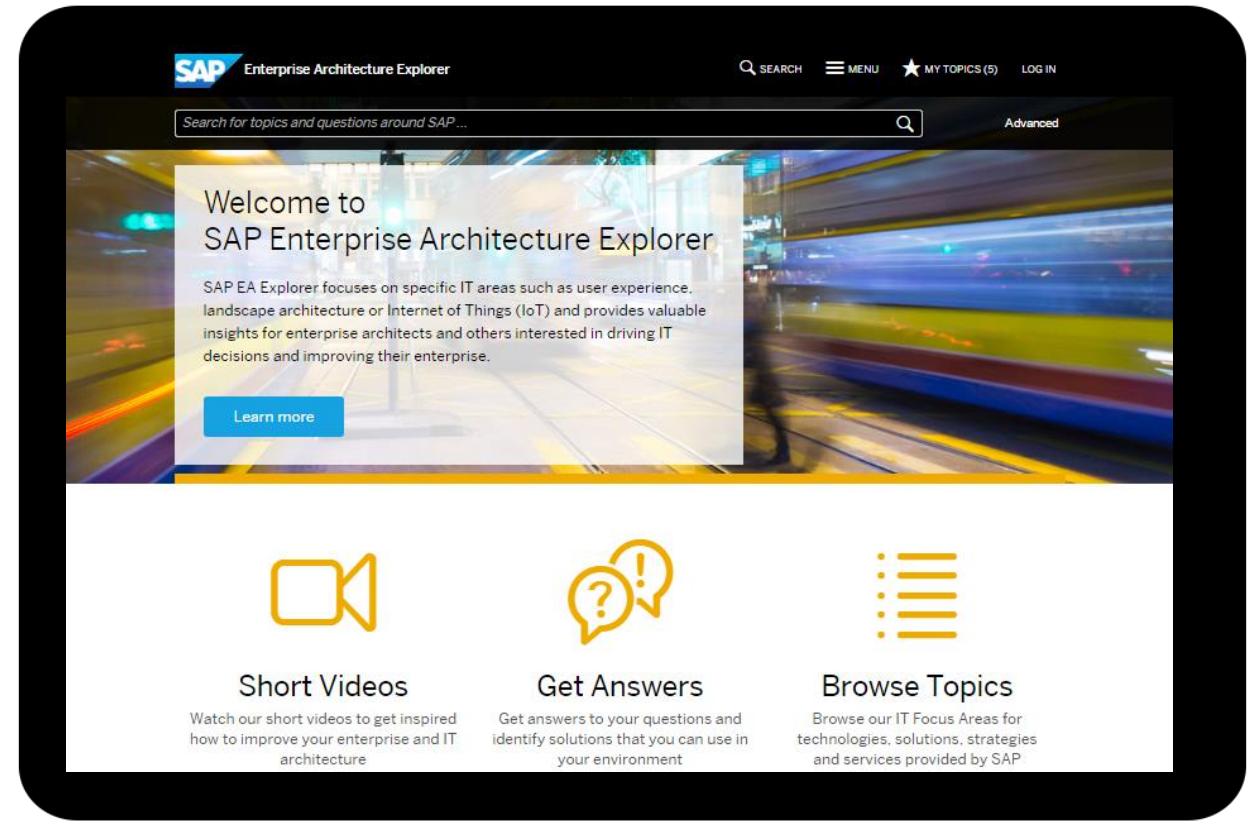
The screenshot shows a blog post from the SAP IoT Solutions blog. The header includes the SAP Community Network logo, 'Log On', 'Join Us', and a search bar. The main content area displays a blog post titled 'SAP Launches New Innovative IoT Solution: SAP Connected Goods' by Elvira Wallis, posted on Aug 11, 2016. The post has 149 posts. Below the post, there's a summary: 'The worldwide adoption of IoT devices will see explosive growth over the next few years. According to the 2015 IDC Worldwide Internet of Things Forecast, by 2020 there will be a projected 30 billion connected devices and a revenue opportunity of \$1.7T for the ecosystem. Enterprises are definitely aware of this digital megatrend, and have been planning to leverage innovative IoT technology to collect, process and analyze big data generated by smart connected devices.' At the bottom, there are filters for 'Author', 'Date', and 'Tag', along with 'Login' and 'Register' buttons.

SAP Tools and Resources

SAP Enterprise Architecture Explorer

SAP Enterprise Architecture Explorer

https://eaexplorer.hana.ondemand.com/_item.html?id=11495#/facet/19/12000

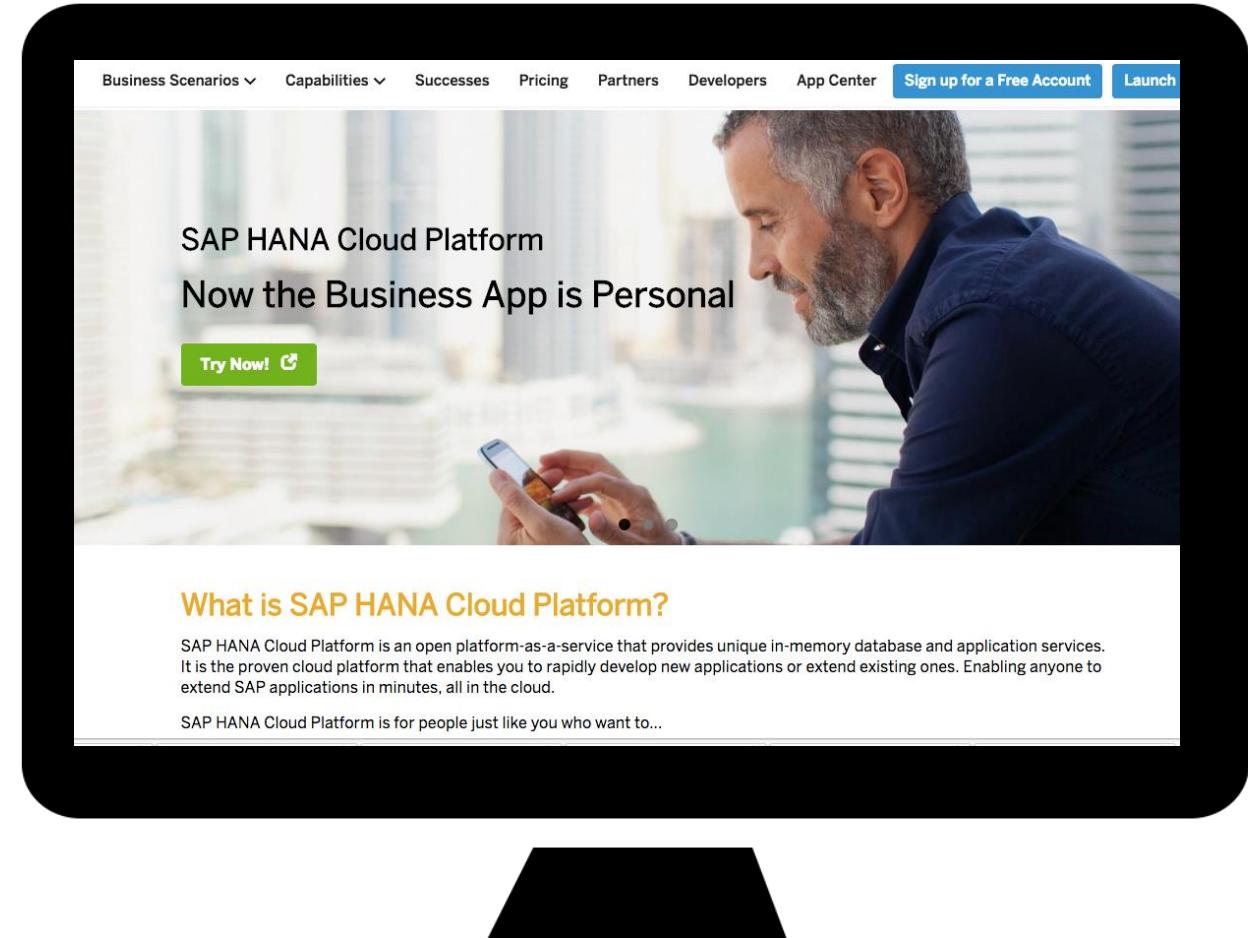


SAP Tools and Resources

SAP HANA Cloud Platform (HCP)

Learn more about HCP

<https://hcp.sap.com/index.html>



SAP Tools and Resources

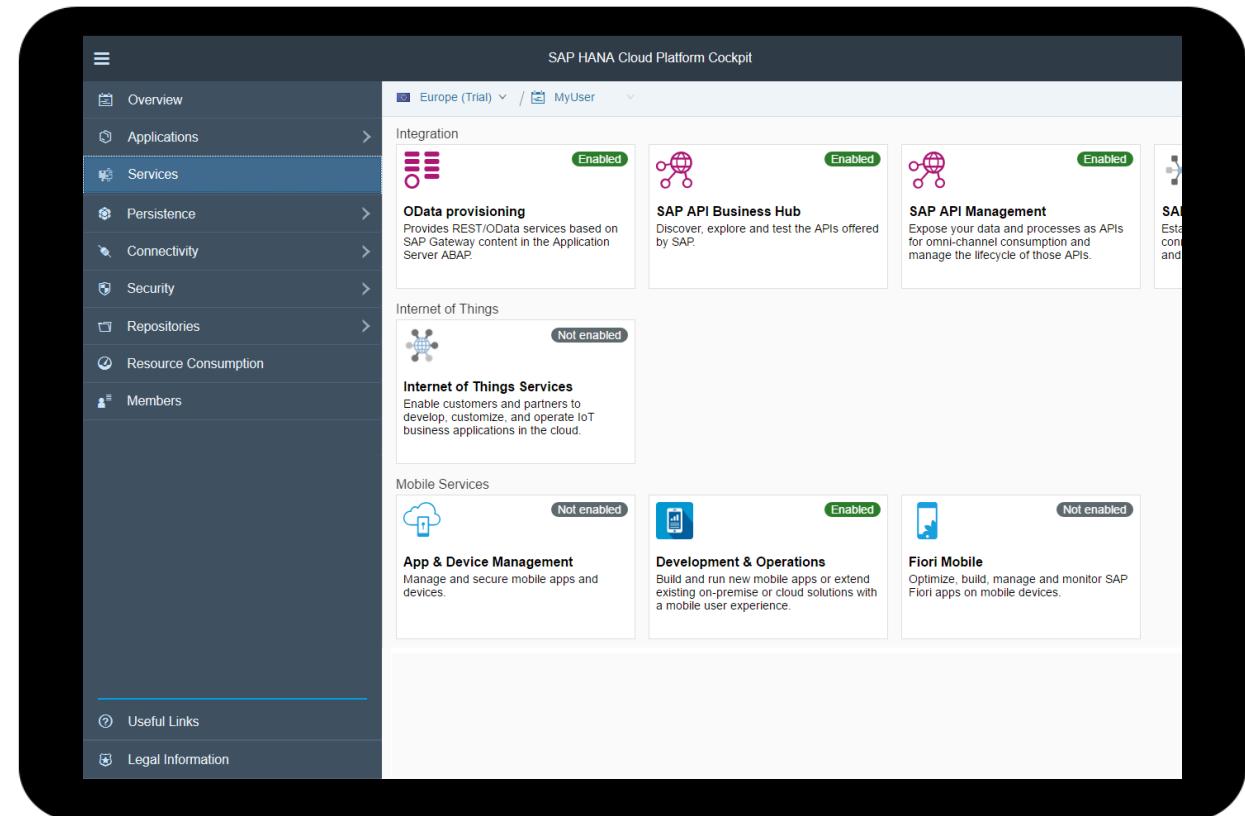
SAP HANA Cloud Platform IoT Services

SAP HANA Cloud Platform IoT Services Guide

<http://scn.sap.com/docs/DOC-63811>

Enabling SAP HCP IoT Services

<https://help.hana.ondemand.com/iot/frameworkset.htm?53ad6006e50f4b0ca02402daa6da5bb5.html>

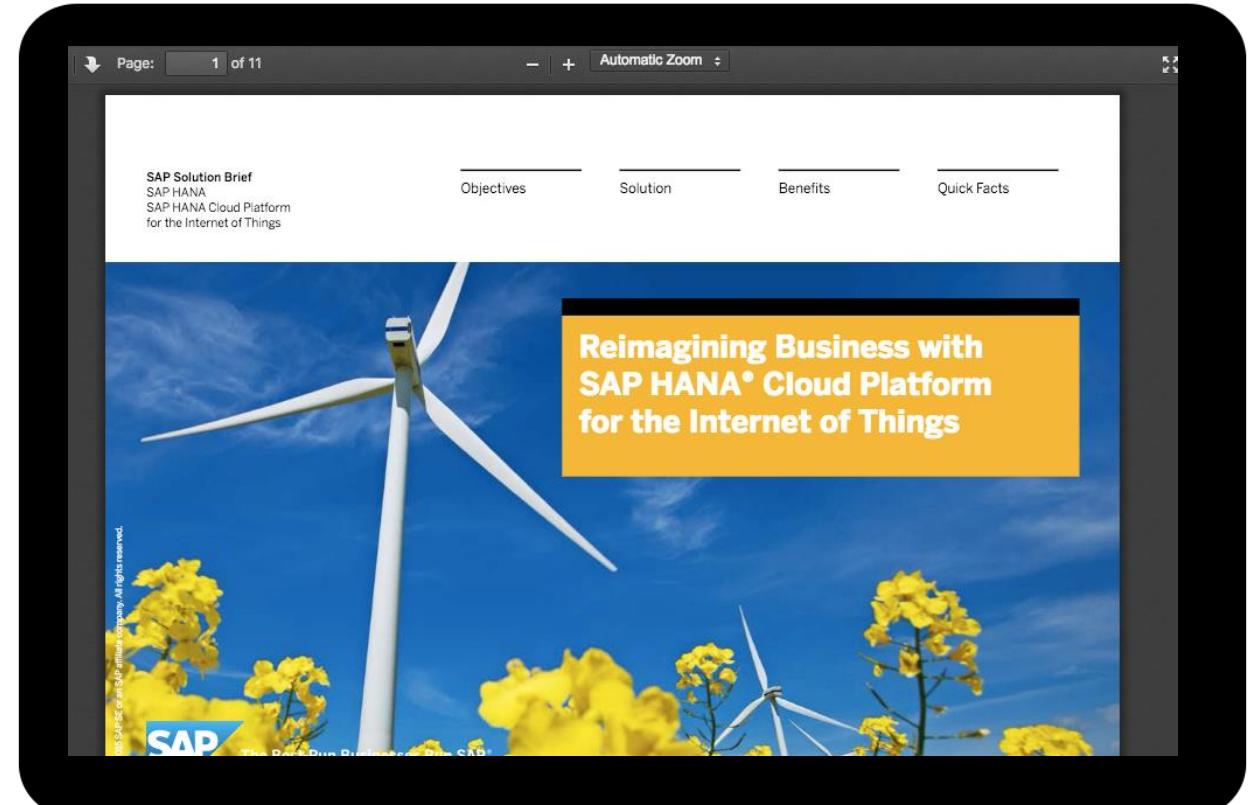


SAP Tools and Resources

SAP HANA Cloud Platform for IoT

Reimagining Business with SAP HANA for IoT

<http://go.sap.com/documents/2015/04/3adf7520-247c-0010-82c7-eda71af511fa.html>

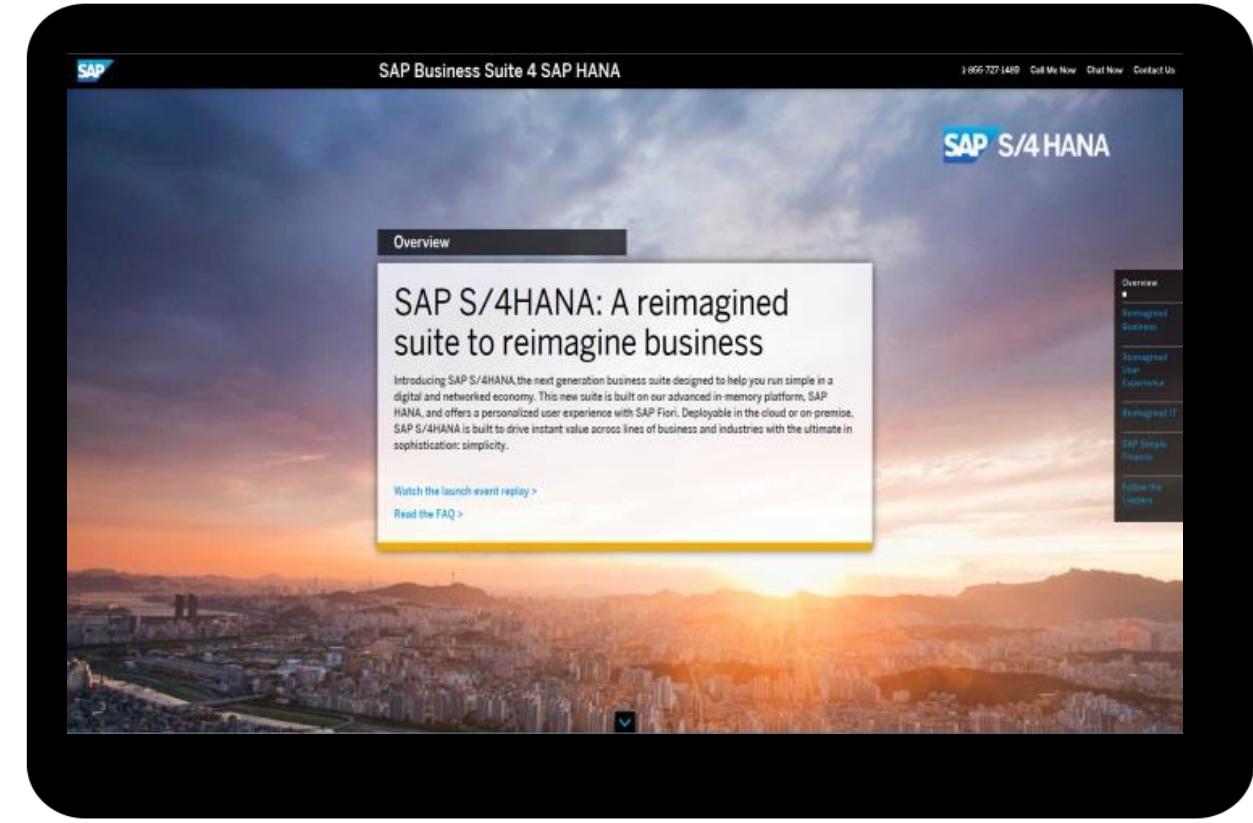


SAP Tools and Resources

SAP S/4HANA

SAP S/4HANA

- [SAP S/4HANA Best Practices](#)
- [SAP S/4HANA Cookbook](#)
- scn.sap.com/community/s4hana/
- sap.com/s4hana
- sap.com/activate



SAP Tools and Resources

Connected Goods

Connected Goods

Official Homepage

- www.sap.com/connected-goods

Blogs

- [SAP Launches New Innovative IoT Solution: SAP Connected Goods](#)
- [Quench Your Thirst for Innovation with Smart Vending Machines](#)
- [IoT Coolness: The Cool Factor of Connected Coolers](#)
- [Saving Time - Connecting The Next Million Devices](#)

SAP Tools and Resources

SAP Dynamic Edge Processing

Configuration Guides

<https://help.sap.com/dep20>

SCN Introduction

<https://scn.sap.com/community/internet-of-things/blog/2016/06/21/introducing-sap-dynamic-edge-processing-think-of-it-as-summer-solstice-for-the-internet-of-things>

SAP Solutions for the Internet of Things

Introducing SAP Dynamic Edge Processing: Think of It as Summer Solstice for the Internet of Things

Posted by Bob Caswell in SAP Solutions for the Internet of Things on Jun 21, 2016 6:40:04 PM

in Share 48 G+1 1 Tweet Like 0

Each year around this time the world celebrates the summer solstice, that is, the beginning of summer and the longest day of the year where those of us in the Northern Hemisphere experience upwards of 15 hours of light! Perhaps not surprisingly, it's been celebrated for thousands of years as a symbol of renewal, fertility, and harvest. I mean, think about it especially in a pre-enlightened era, who wouldn't be excited for the time of year when days are longer, the weather is better, and more gets done?

Now, imagine if you had the tools to control daylight and weather and make it the equivalent of summer solstice all year long. No offense to my winter-loving friends, but I'm pretty sure most of the world would opt for more summer, more of the time.

But what does this have to do with the Internet of Things (IoT)?

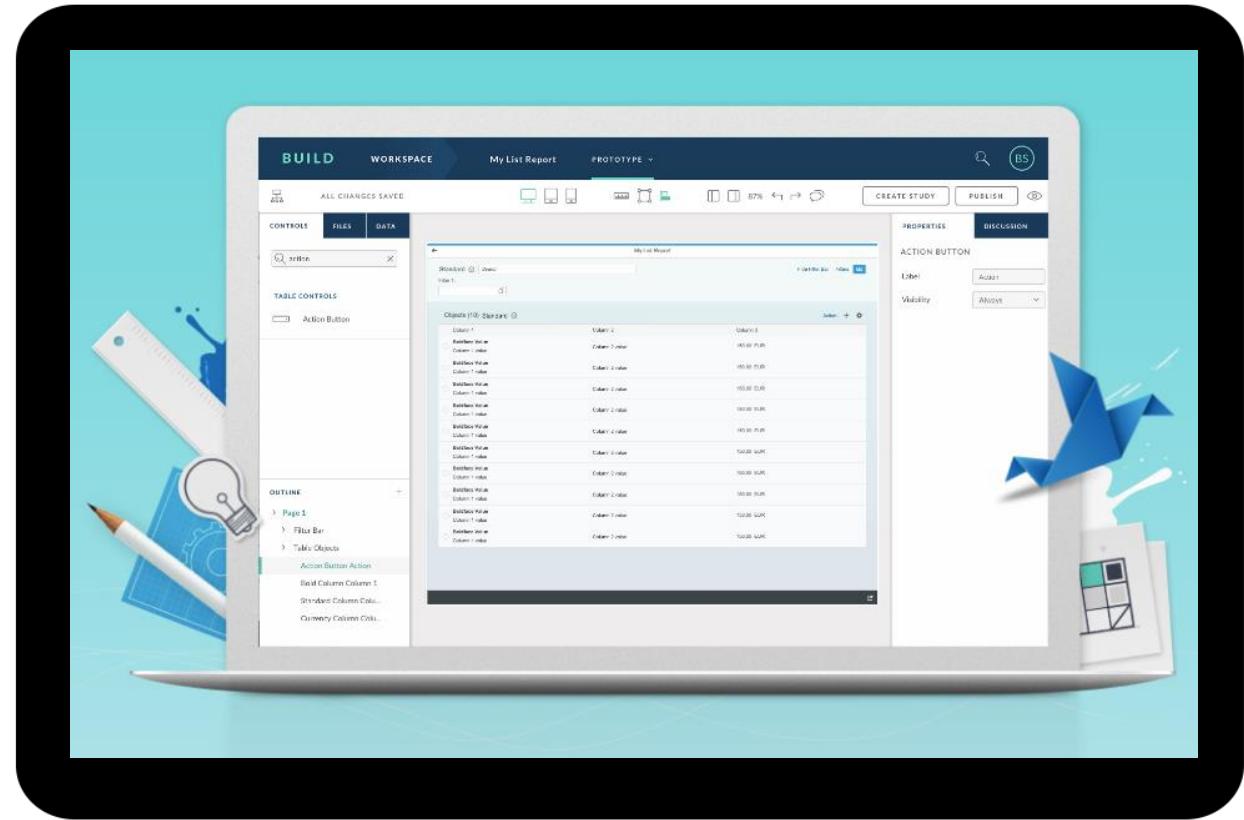


SAP Tools and Resources

BUILD

Prototype with BUILD

<https://www.build.me/>

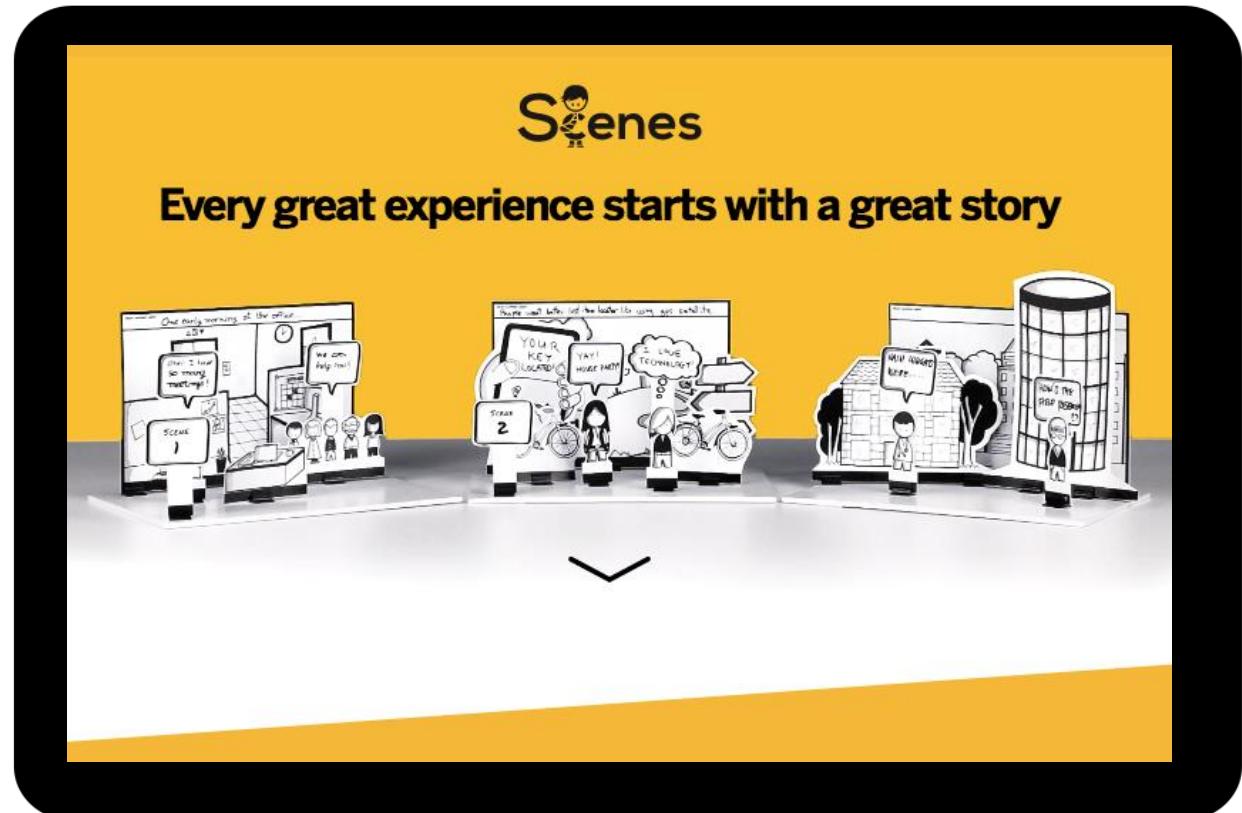


SAP Tools and Resources

DCC Scenes

Build a Story with Scenes

<https://experience.sap.com/designservices/scenes>

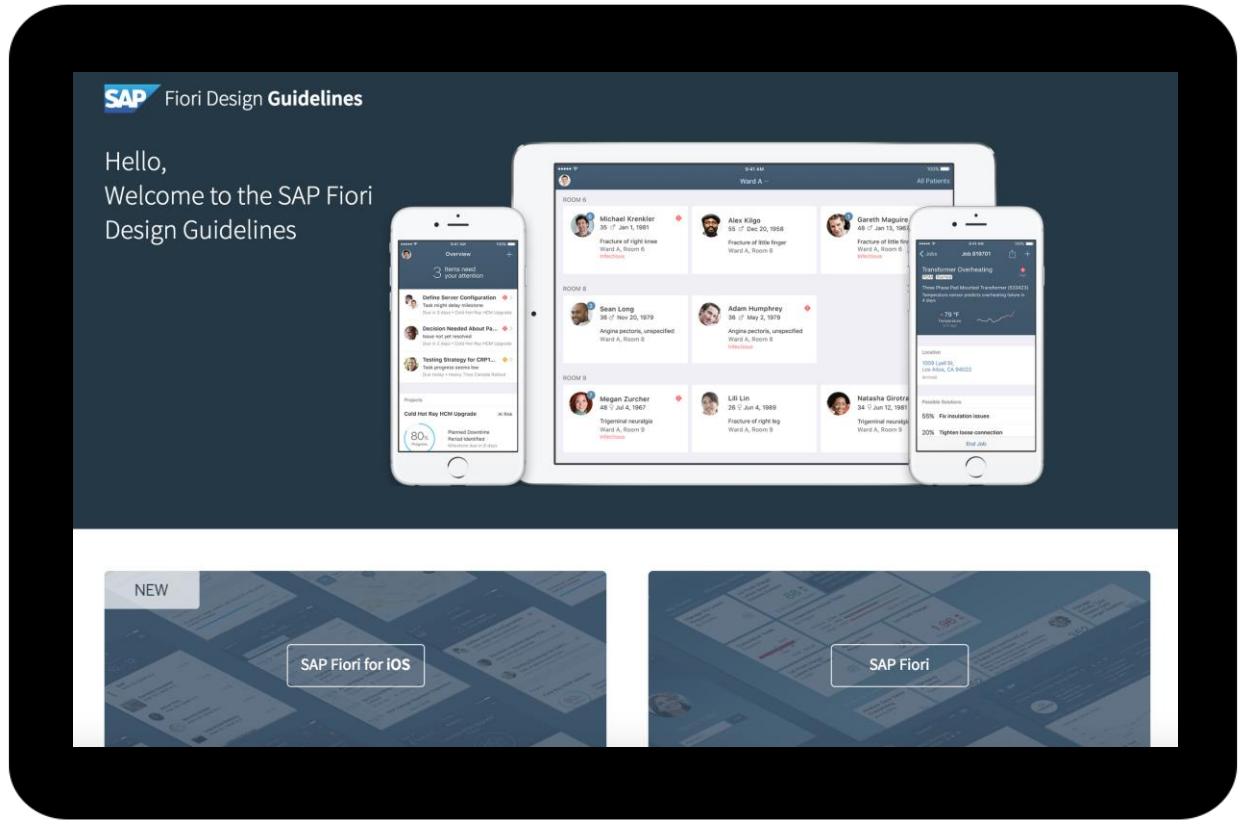


SAP Tools and Resources

Fiori Design Guidelines

Fiori Design Guidelines:

<https://experience.sap.com/fiori-design/>



SAP Tools and Resources

openSAP Fiori Apps Gallery

Gallery of customer-created apps:

<https://open.sap.com/courses/fix2/items/2fgN9KBuwQEz6jd9Ck0pZ>

The screenshot shows the openSAP Fiori Apps Gallery interface. At the top right, there are links for 'Channels', 'Courses', 'News', and a language selector 'EN'. The main content area has a dark header bar with the 'openSAP' logo. Below it, a sidebar on the left lists various sections: 'Meet the Experts live', 'Week 7', 'I like, I Wish', 'Design Challenge', 'Develop Challenge' (which is highlighted with an orange border), 'Submission and Peer Assessment', 'Top 220 Fiori Apps from the Develop Challenge', and 'Discussions'. To the right of the sidebar, the page is divided into several sections: 'Winners' (listing Matthew Dion, Jacob Tan, and Pius Kirrmann with their respective app details), 'SAP Partner Winners' (listing Jacob Tan, Grzegorz Owczarek, and Stefano Scalincinati), 'Runners-up' (listing Robin van het Hof, Roberto Candusio, Caroline Schulten-Schuster, Christian Sonek, Kevin Salt, Abhinav Agarwal, Ritu Sharma, Prakash Bellamkonda, Sainath Madabooshi Sundararajan, Samuel Melloul, Catharina Broermann, Jaime Ojeda González, Holt Etheridge III, and Michael Visser with their app details), and 'Best of the Rest' (listing Saurabh Agarwal, Fujitsu Consulting India Pvt Ltd, House Buyer Assistant App, and Trainer Check App). A large black trapezoid graphic is positioned at the bottom right of the page.

SAP IoT Tools and Resources

Unit Summary and Looking Ahead



Unit Summary

- Importance of Research
- SAP Tools and Resources
- BUILD
- Additional Sources



Looking Ahead

- Guest Speaker: Intel and IoT



Thank you

Contact information:

open@sap.com

openSAP

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Imagine IoT

2.5 Example of IoT Experiences – Intel



openSAP

Example of IoT Experiences – Intel

Intel's approach to IoT



OUR APPROACH

CREATE VERTICAL SOLUTIONS + BUILD HORIZONTAL PLATFORM & PRODUCTS + DRIVE STANDARDS & INTEROPERABILITY + BUILD A STRONG ECOSYSTEM

Example of IoT Experiences – Intel

Open, secure, and scalable



Reference architectures for IoT...

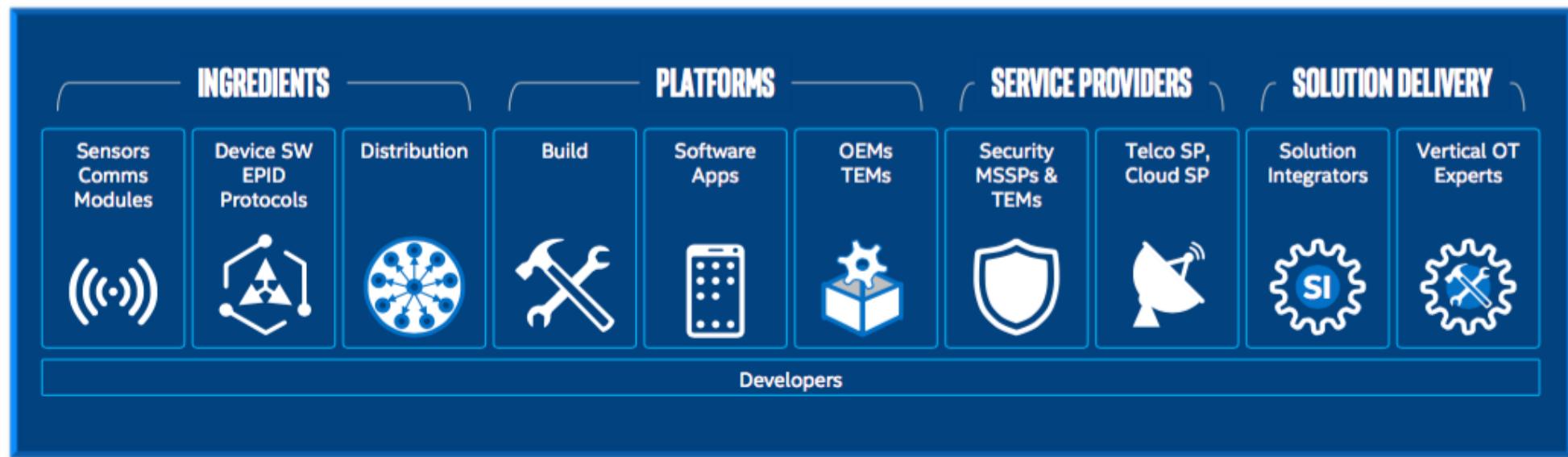
implemented via **products and technologies** from
Intel and the ecosystem.

An **open, secure, and scalable** approach to
building IoT solutions

Example of IoT Experiences – Intel

Building a stronger ecosystem

Winning vendors in the IOT will be those participants that create or join the strongest ecosystem and provide a holistic offer to their customers.



Example of IoT Experiences – Intel

The Intel® IoT Platform capabilities

1) → Connecting the Unconnected

“Things” easily connect, communicate, and work together

Connect



“Things” and networks are monitored, secure, and managed

Secure & Manage



2) → Smart and Connected Things

Analyze, expose, and manage data to provide business insights

Analyze & Expose

Predict how the devices or processes perform and take actions

Predict



3) → Autonomy

Innovate, optimize end-to-end systems, autonomous behavior

Optimize



Product Experience - Consistency - Interoperability

Example IoT Experience

What is it and how does it work?

Example of IoT Experiences – Intel

Demo setup – worker



STORY

- ❑ Joe is an electrician working on an oil rig.
- ❑ He is equipped with *intelligent IoT wearable sensors*.

BENEFITS

- ❑ Providing new dimensions of insight in real time
- ❑ Crowdsource data

Example of IoT Experiences – Intel

Intel intelligent edge for enterprise

What  products are used?

- **Intel® IoT Gateway (ADLINK i7Core)**
- **Intelligent Device Platform (IDP) version 3**
- **Intel® Quark SE SoC microcontroller with BLE and on-board analytics**
- **WR Helix Device Cloud for Management**
- **Sensor Connectivity**

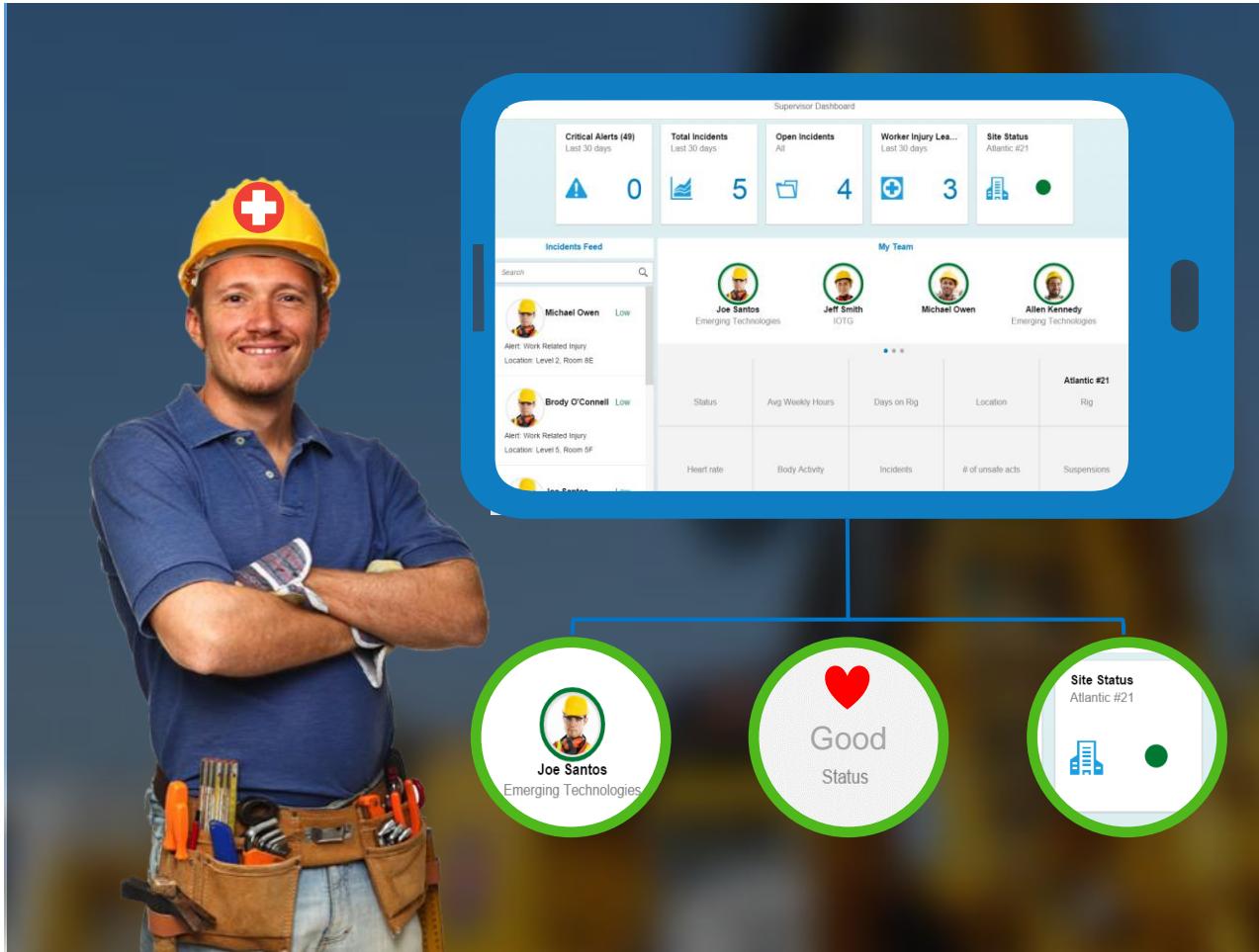
Real Time Pub/Sub DDS data bus for service integration on Gateways (Ecosystem)

What  products are used?

- **IoT foundation bundle for SAP HANA**
 - SAP Dynamic Edge Processing
 - SAP HANA smart data streaming
 - SAP HANA remote data sync (MobiLink)
- **IoT intelligent edge processing bundle for SAP HANA**
 - Streaming Lite from SAP HANA smart data streaming
 - SAP SQL Anywhere and sync client
- **TARS (transaction availability for remote sites) RCS application**
- **SAP HANA Cloud Platform**

Example of IoT Experiences – Intel

Demo setup – supervisor



STORY

- Sam is Joe's supervisor.
- He is able to have **real-time visibility** into the **health and safety of his team**.

BENEFITS

- Real-time awareness of incidents/hazardous events
- Making connections between people and hazardous events
- Ensuring compliance
- Act on dangerous situations in real time

Example of IoT Experiences – Intel

Demo story – CO gas problem



STORY

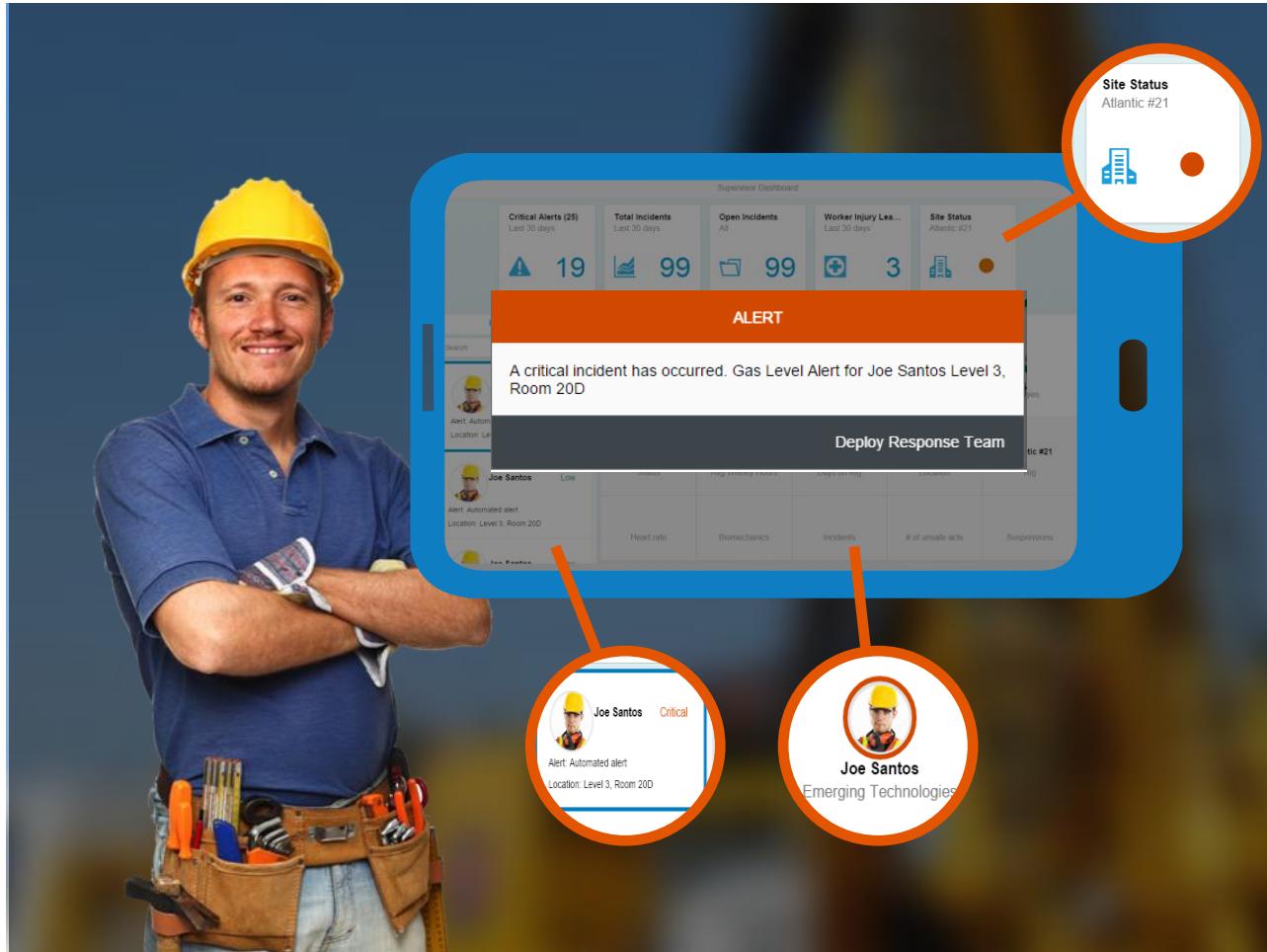
- ❑ Joe's sensor detects a high concentration of CO and an alert gets triggered.
- ❑ His watch buzzes and warning lights in the area actuate.

BENEFITS

- ❑ Real-time detection of hazardous events
- ❑ Complex data analysis on the edge
- ❑ Alerts and automation
- ❑ Peer-to-peer messaging adds robustness

Example of IoT Experiences – Intel

Demo story – supervisor reacts to CO gas problem



STORY

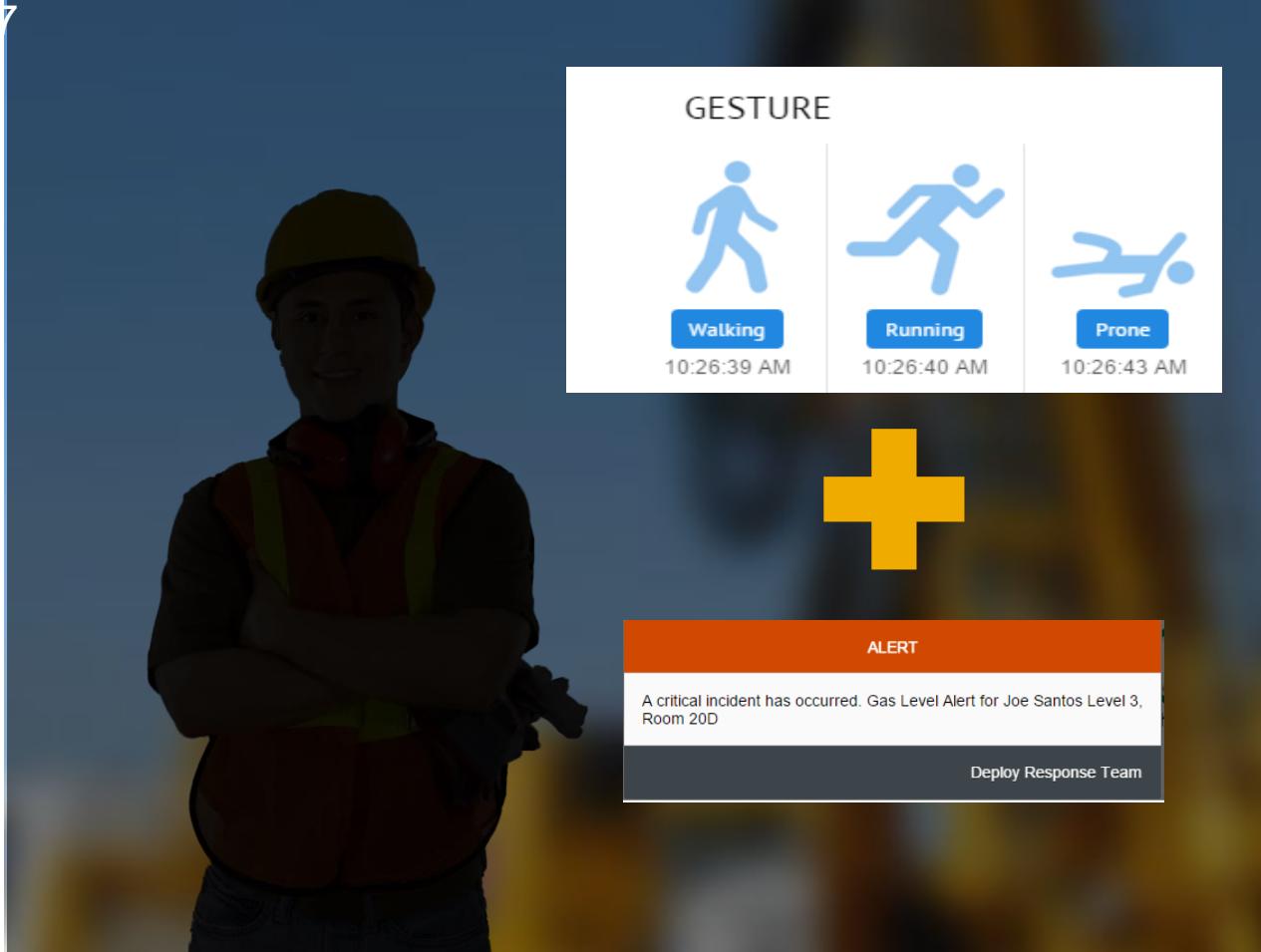
- Sam the supervisor is also alerted in real time.
- He sends the response team and follows protocol by making sure his team is in the muster area.

BENEFITS

- Immediate notification of problems
- Knowing where your team members are at all times

Example of IoT Experiences – Intel

Demo story – Joe has fallen during evacuation



STORY

- ❑ Joe has an intelligent wearable sensor with on-board analytics.
- ❑ Currently it is detecting that Joe is prone.
- ❑ Sam is now aware that Joe needs to be rescued right away.

BENEFITS

- ❑ Complex data analysis on the edge
- ❑ Workflow management without connectivity

Example of IoT Experiences – Intel

Demo story – EH&S incident automatically created with IoT data

Basic Info (1 of 7)

WHAT happened?

*Incident Name: Gas Level Alert for Joe Santos

Description of Events: Gas levels are abnormally high for Joe Santos (MH01). GAS: -8.00. POSTURE: Standing. PULSE: 62

Immediate Actions: Evacuate

Incident Type: Automated alert

WHEN did it happen?

Date: 2015/11/13

STORY

- Sam looks into Joe's incident on the EH&S application.
- He's able to look into the details and add changes, all while being offline.

BENEFITS

- Automated incidents
- Integration of sensor data directly into EH&S system

Example of IoT Experiences – Intel

Demo story – benefits



STORY

- ❑ Joe was rescued because we were able to use intelligent sensors on a gateway with local analytics reacting in real time.

BENEFITS

- ❑ Avoiding serious medical or even fatal incidents



Thank you

Contact information:

open@sap.com

openSAP

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Imagine IoT

2.6 Example of IoT Experiences – XMPro



openSAP

Example of IoT Experiences – XMPro

XMPro Introduction

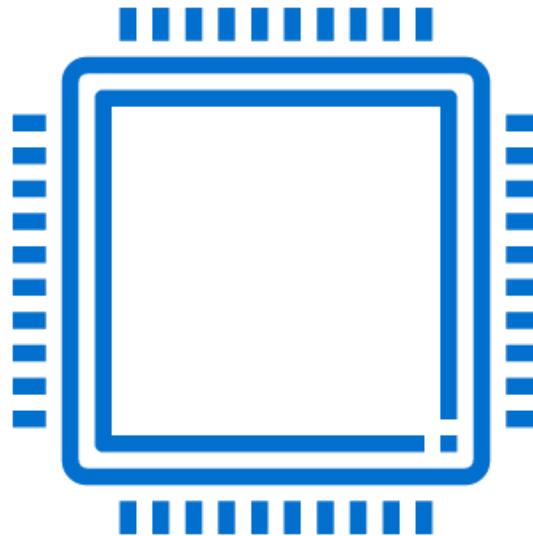
XMPro

Agile Application Suite for Industrial IoT



Example of IoT Experiences – XMPro

Why IoT application suite?

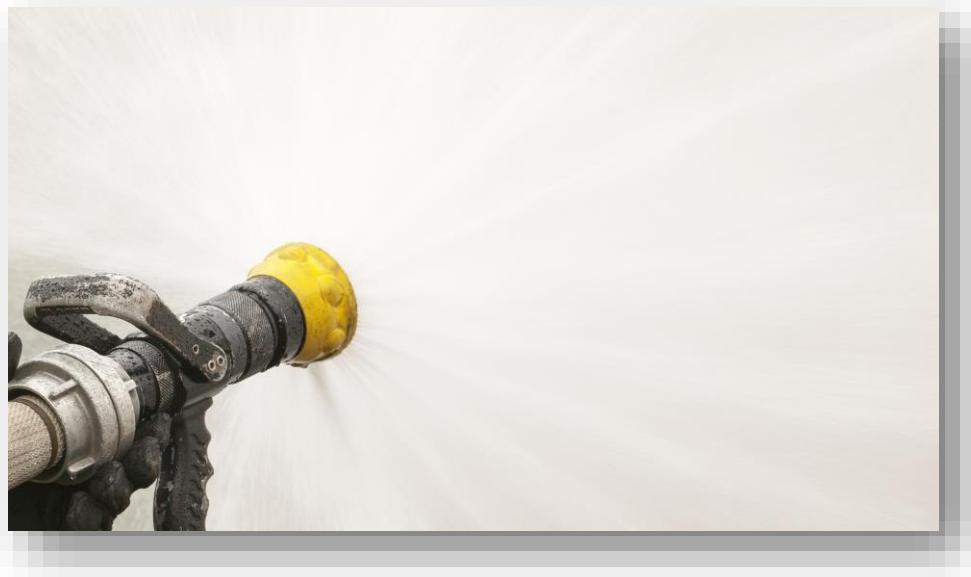


**30 billion
devices**

**5 million
applications**

Example of IoT Experiences – XMPro

How to exploit the deluge of data to improve operational excellence



Current Issues

- Lots of equipment data but little insight
- Excessive latency between events and action
- Lengthy, complex IT projects with questionable ROI

Operational goals

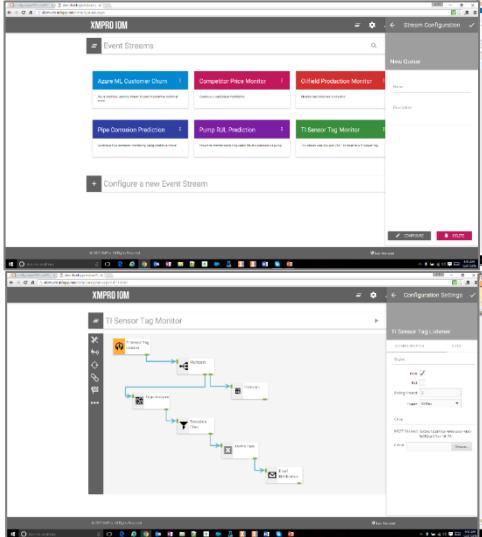
- Real-time responsiveness to equipment issues
- Move from reactive to predictive operations
- Improve asset utilization
- Application development in weeks

Example of IoT Experiences – XMPro

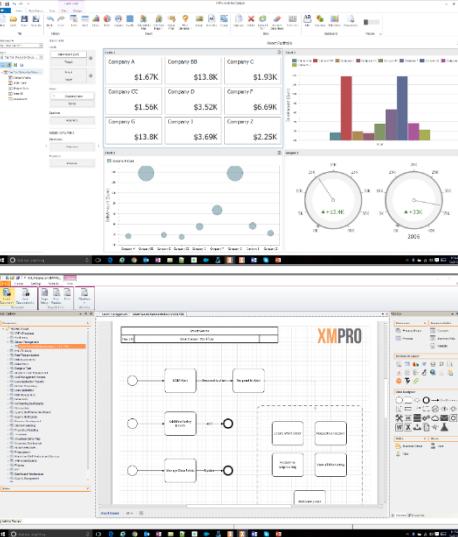
XMPro Agile Application Suite for Industrial IoT

XMPro Agile Design Studio

Use Case Manager



Dashboard Designer



Stream Designer

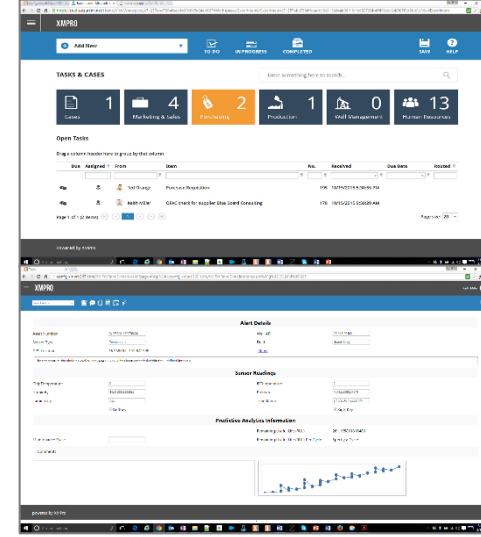


Workflow Designer

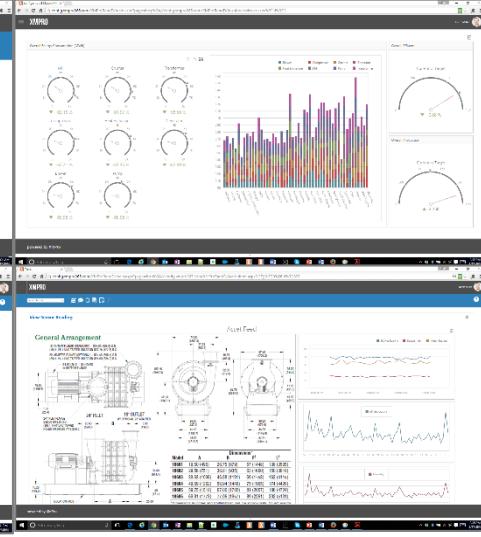


XMPro Action Console

Performance Monitoring



KPI Dashboards



Visible Decision Trail

Drill-Down Analysis

Example of IoT Experiences – XMPro

XMPro Stream Designer

For fast, **visual orchestration** of event flows from **diverse** sensors and data sources to **actions**

Heterogeneous Data Sources



Historian/PI



Sensor Vendor 1



Sensor Vendor 2



SAP Machine Learning



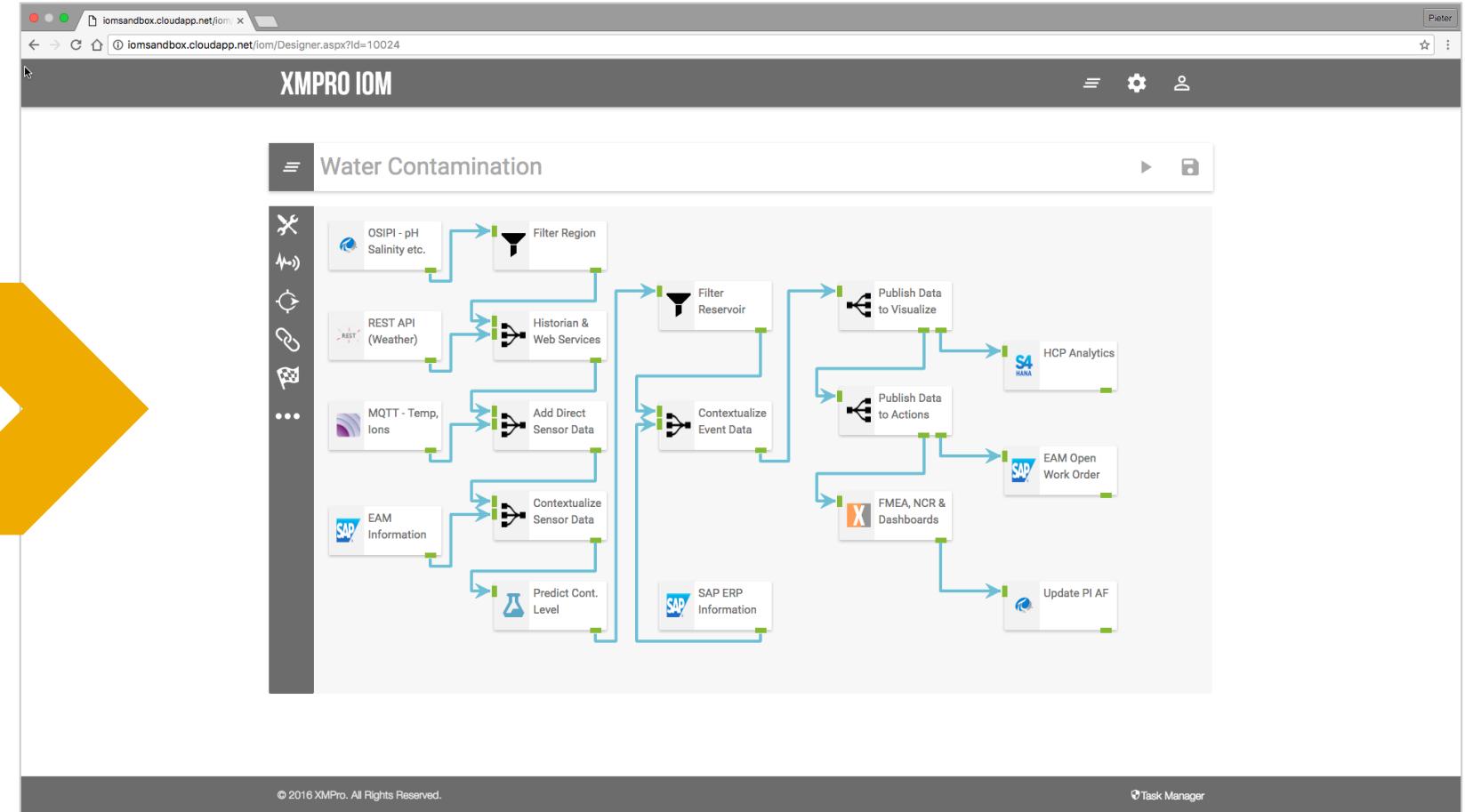
Vendor Cloud



Business Apps



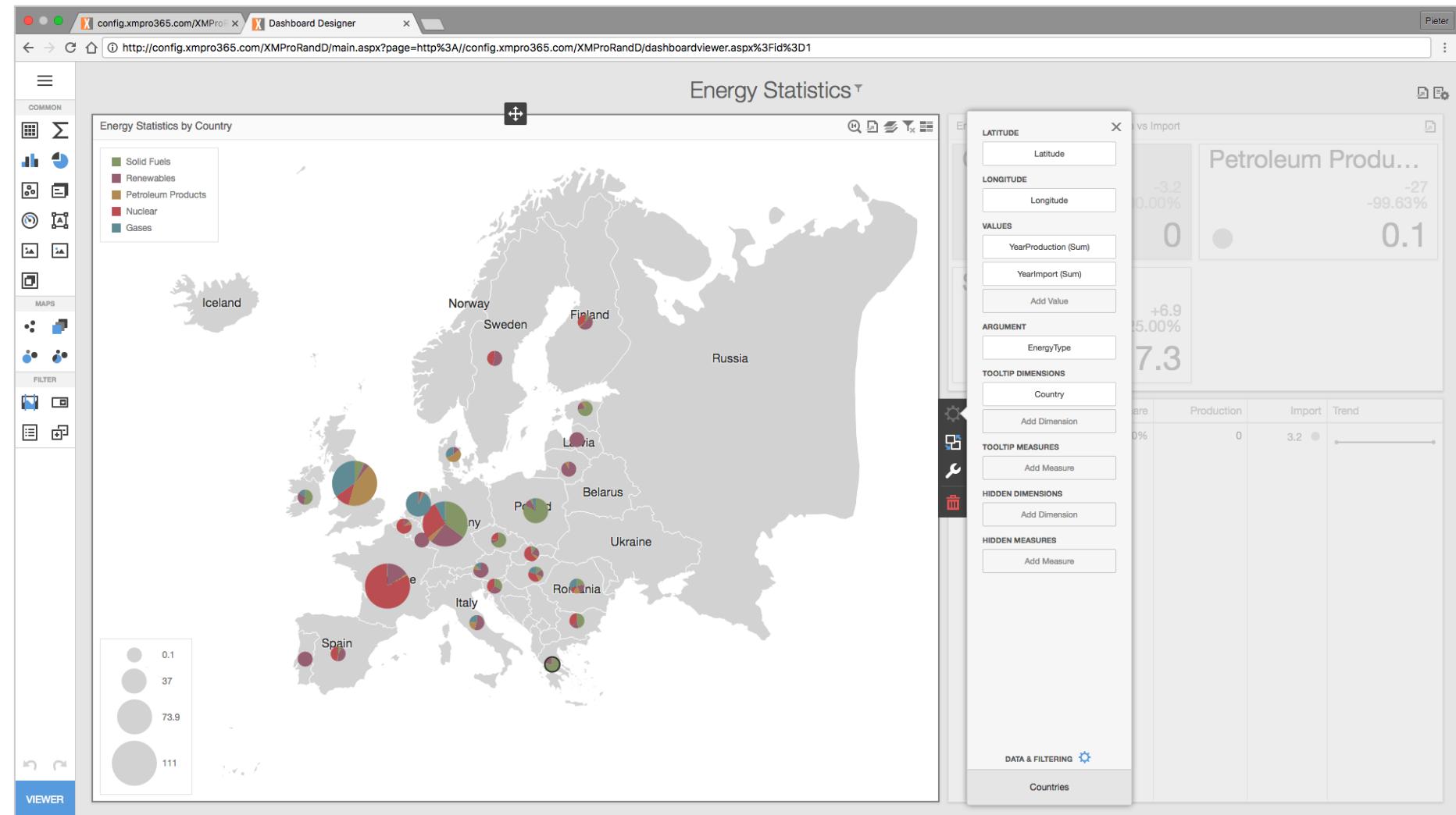
OPS Databases



Example of IoT Experiences – XMPro

Big picture performance monitoring

View **real-time** data with **contextual** information for better, faster decisions



Example of IoT Experiences – XMPro

Rapid drill-down for root cause analysis

View **real-time** data with
contextual information for
better, faster decisions

The screenshot displays the XMPro software interface. On the left, a vertical menu includes options like 'Create Work Order', 'Respond to Retail Alert', 'FMEA Response', 'Escalate To Engineering', 'Request Concession', and 'Reset'. The main area features a 'General Arrangement' diagram of a pump unit with various dimensions labeled in inches and millimeters. To the right of the diagram is a table of dimensions for six different models (18601 through 18606). Below the table is a note stating: '*Dimensions in inches and (millimeters) and are approximate. Do not use for...'. On the far right, there are three stacked line charts showing real-time data: 'Asset Feed' (Blower Bearing, Lower Inlet, Motor Bearing), 'IRTemperature' (Infrared Temperature), and 'Humidity'.

General Arrangement

18" OUTLET FLANGE (STANDARD) - Ø25.00 (635.0) O.D.
(16) 1 1/8-7 UNC TAPPED HOLES ON Ø22.75 (577.8) B.C.
20" ADAPTER FLANGE (OPTIONAL) - Ø27.50 (698.5) O.D.
(20) 1 1/4-7 UNC TAPPED HOLES ON Ø25.00 (635.0) B.C.

Ø1.00 (25.4) - (6) HOLES IN BOTTOM FLANGE

46.00 (1168.4)

1.00 (25.4)

24" INLET FLANGE Ø32.00 (812.8) O.D.
(20) 1 1/4-7 UNC TAPPED HOLES ON Ø29.50 (749.3) B.C.

20.63 (524.0)

18" OUTLET W/ OPTIONAL 20" ADAPTER 5.38 (136.5)

100.76 (2559.3)

52.76 (1340.1)

74.50 (1892.3)

27.25 (692.2)

16.00 (406.4)

67.25 (1708.2)

36.00 (914.4)

32.00 (812.8)

88.76 (2254.5)

17.00 (431.8)

19.00 (482.6)

36.50 (927.1)

45.50 (1155.7)

48.00 (1219.2)

38.25 (971.5)

45.00 (1143.0)

57.31 (1455.7)

36.00 (914.4)

16.26 (413.0)

ISOLATION PADS

A 25.50 (647.7)

B 20.63 (524.0)

Dimensions*

Model	A	B	F†	L†
18601	19.50 (495)	26.75 (679)	57 (1448)	138 (3505)
18602	29.56 (751)	36.81 (935)	63 (1600)	150 (3810)
18603	39.63 (1006)	46.88 (1191)	69 (1753)	162 (4115)
18604	49.69 (1262)	56.94 (1446)	75 (1905)	174 (4420)
18605	59.75 (1518)	67.00 (1702)	81 (2057)	186 (4724)
18606	69.81 (1773)	77.06 (1957)	89 (2261)	202 (5131)

*Dimensions in inches and (millimeters) and are approximate. Do not use for...

powered by XMPro

Blower Bearing Lower Inlet Motor Bearing

IRTemperature

Humidity

Example of IoT Experiences – XMPro

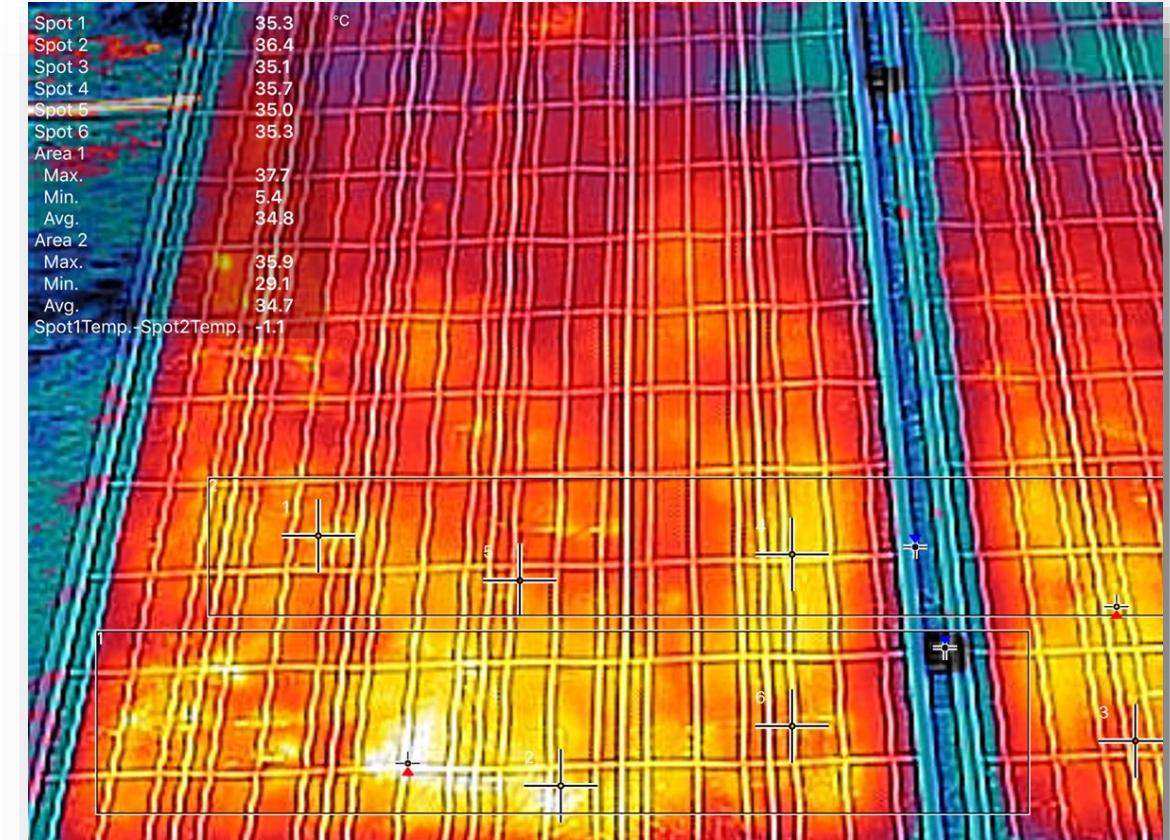
Renewable energy example



Example of IoT Experiences – XMPro

Images captured with a drone/UAV

Dirty solar panels don't produce as much power as clean panels. That loss can be as high as 25%.
— National Renewable Energy Laboratory



Example of IoT Experiences – XMPro

Build applications for a heterogeneous world

The image displays the XMPro Agile Application Suite for Industrial IoT, which integrates various SAP and third-party applications. The central feature is the XMPro logo with the tagline "Agile Application Suite for Industrial IoT". Surrounding the center are several application modules:

- EAM**: SAP EAM interface showing cases and tasks.
- CRM**: SAP CRM interface showing marketing & sales, purchasing, production, well management, and human resources data.
- GIS**: Esri GIS interface showing maps and data visualization.
- SCADA/PLC**: OSIsoft SCADA/PLC interface showing industrial process monitoring.
- Machine Learning**: SAP Machine Learning interface showing predictive analytics.
- IoT Gateway**: Intel IoT Gateway interface showing product cloud and data analysis.
- Product Cloud**: Rockwell Automation Product Cloud interface showing product details and data.
- SCM**: SAP SCM interface showing supply chain management data.
- ERP**: SAP ERP interface showing financial and operational data.
- OPS Databases**: SAP OPS Databases interface showing operational databases.

Example of IoT Experiences – XMPro

More information

www.xmpro.com/openSAP



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Contact information:

open@sap.com

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