AWS in Manufacturing

Virtual Tour Digital Builders Showroom

March 23, 2021

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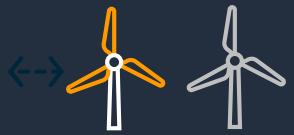
Smart Factory Use Cases

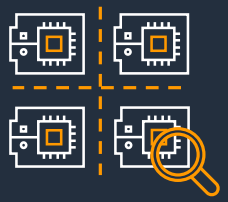
Production/Process optimization

Preventive/predictive maintenance for machines

Machine as a service



Digital Twin



Computer vision for quality control

Automated material management

Track & Trace

OEE visualization

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Agenda for today

- Welcome and Introduction
- AWS Customer Case Studies:
  - Deutsche Fußball Liga
  - Kärcher
- Interactive Demo: Amazon Rekognition for Personal Protective Equipment
- Prototypes:
  - 1) Predictive Quality for Industrial
  - 2) Industrial IoT / Digital Twin in the Cloud
- AWS Case Study: BMW (Lake House Architecture)
- Q&A and AWS Resources

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Digital Builders Showroom Munich

1st Showroom

2nd Showroom

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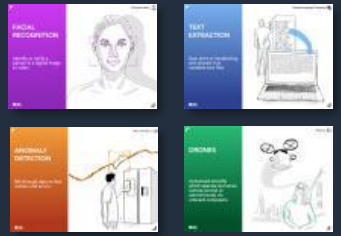
An immersive space to experience emerging technologies first hand

DISCOVER
Explore how technology is altering your ecosystems

INSPIRE
Get inspired by what's already feasible today in technology

CO-CREATE
Ideate on new ideas to unlock un-utilized potential



EXECUTE
Discuss how to turn your ideas into reality with experts

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Discovery: Explore how others have leveraged the AWS Cloud already

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aws professional services

DFL re-imagines fan experience

How machine learning is delivering data-driven insights in soccer.

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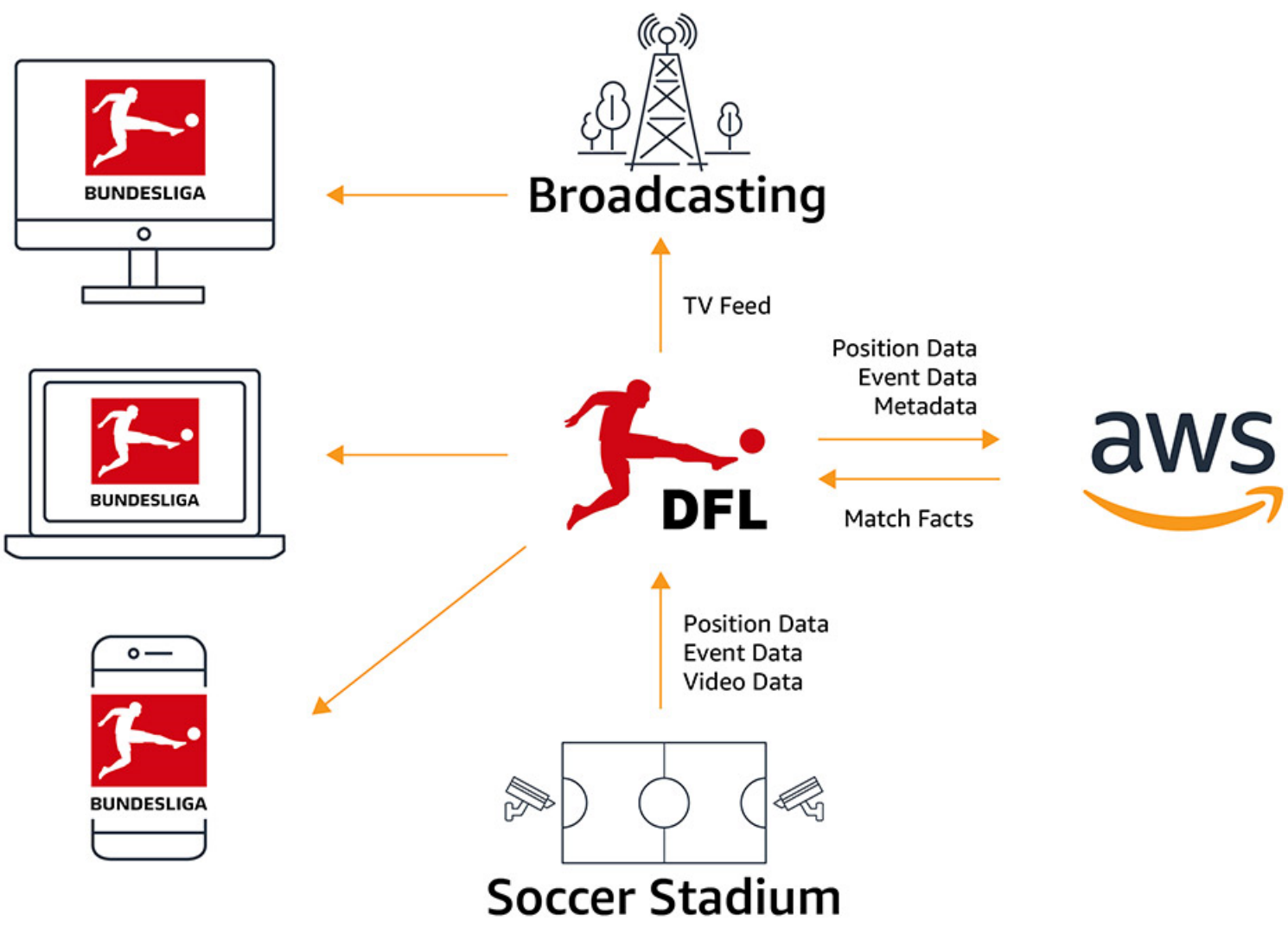
BUNDESLIGA
BUNDESLIGA
BUNDESLIGA
Broadcasting
TV Feed
Position Data
Event Data
Metadata
DFL
Match Facts
aws
Position Data
Event Data
Video Data
Soccer Stadium

Final Outcome and Impact

Brand and Marketing Reach

Bundesliga Match Facts broadcasted in more than 200 countries reaching over 500M Bundesliga fans.

System Performance Improvement

The implemented serverless architecture for streaming of match statistics for web and mobile app increased the overall system performance 10 times compared to the legacy architecture.

Cost Reduction

Savings of ~75% on the infrastructure costs incurred on the data streaming architecture.

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Kärcher drives customer engagement with Contentful and Alexa Skills

The first in its field to give customers the ability to ask questions and control devices using voice control.

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Executive Summary

Challenges

- Make product related content smart through voice assistants and chatbots.
- Inability to update live content on demand.

Solution

- ZOI developed an Alexa Skill Content Skill and Alexa IoT Skill for Kärcher using Contentful's content platform for content delivery.

Impact

- Customers can access up to date information and interact with Kärcher products via voice control.
- Kärcher can scale and has flexibility to deliver new experiences.

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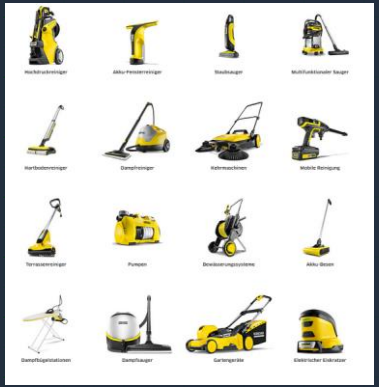
The Challenge: Make Product Related Content Smart through Voice and Chatbots

16 PRODUCT CATEGORIES
Multiple versions and variants



Starting Point

Vastly distributed content

Content in catalogues, apps, web, printed manuals, and videos was vastly distributed and required review and transformation

No clear vision on voice skill

Many ideas for a potential design of the Alexa Skill made it hard to prioritize. Definition of relevant content along the customer journey through a developed customer journey matrix was required

Unclear user behavior and requirements

The definition of utterances and prompts was difficult but necessary to ensure a functioning Alexa Skill and to orchestrate content provision. A recognition schema was developed for the customer

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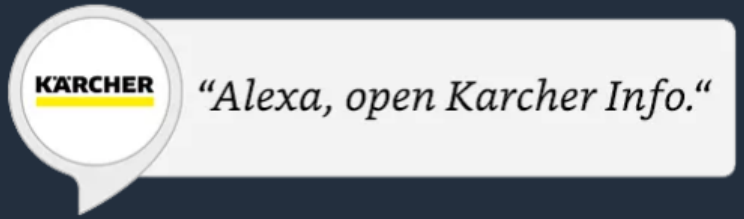
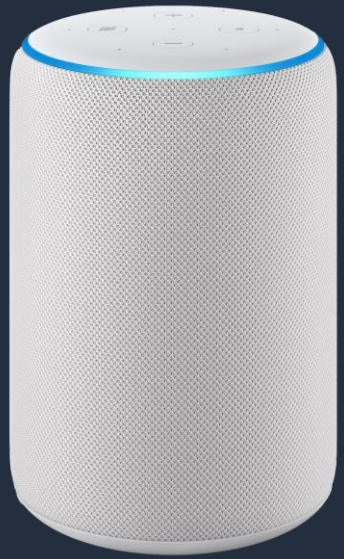
Kärcher Info: Alexa Skill as a new digital Customer Touchpoint





Kärcher Info

Simply discover the world of Kärcher with your voice.

Sample sentences:

- *"Alexa, ask Karcher Info, how can I clean my car."*
- *"Alexa, ask Karcher Info, which high-pressure cleaner do I need."*
- *"Alexa, ask Karcher Info for service."*

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Kärcher and ZOI chose a Serverless Technology Stack

AWS Services

AWS Lambda

Alexa Skill Kit

Other Technologies

Contentful GraphQL API

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Final Outcome and Impact

Kärcher Info: Alexa Skill as new digital Customer Touchpoint

Customers are able to interact with Kärcher and their products through a Alexa Voice Skill that offers content and supports IoT functionalities

Custom content workflows and roles

Content workflows and custom roles make the content transformation easier - from distributed content towards a digital one-brand experience

Easy Automated Content Publishing

Using Contentful allows for instant content changes without redeployment or developer involvement. The marketing team can update content in minutes

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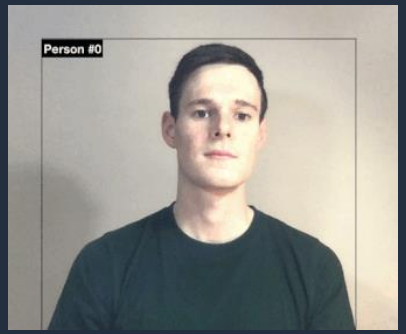
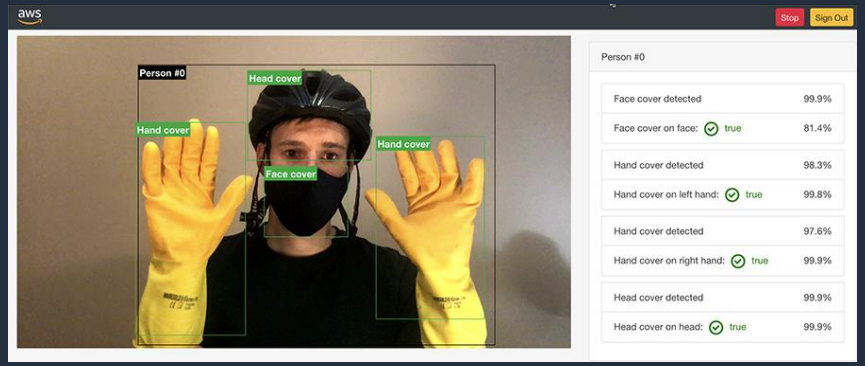
Inspiration: Object Detection through Computer Vision





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Object Detection – Customer Use Cases

Customer: Hong Kong Institute of Vocational Education

Industry: Education

Use Case: Enable a safer classroom and campus by making it easy for their staff to check if students and teachers are wearing face masks as well as remind them in a friendly way.

Customer: Rebel Foods

Industry: Consumer Goods

Use Case: Check that their food delivery employees are wearing a face mask as they pick up orders from the kitchen and deliver them.

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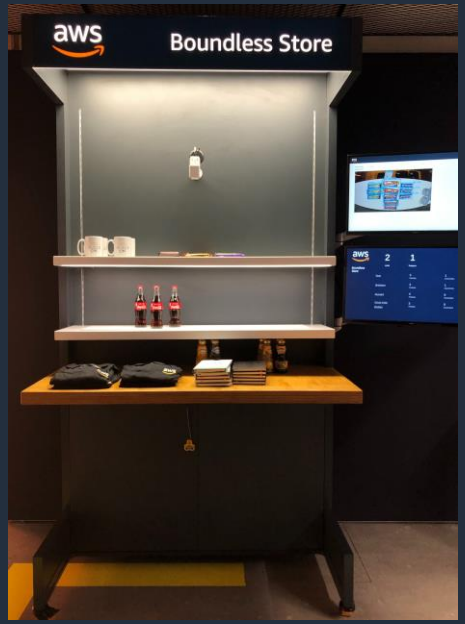
Execution: Prototyping Area



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Execution: Prototyping Area, Luggage Tag Demo

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The machine builds your metal luggage tag

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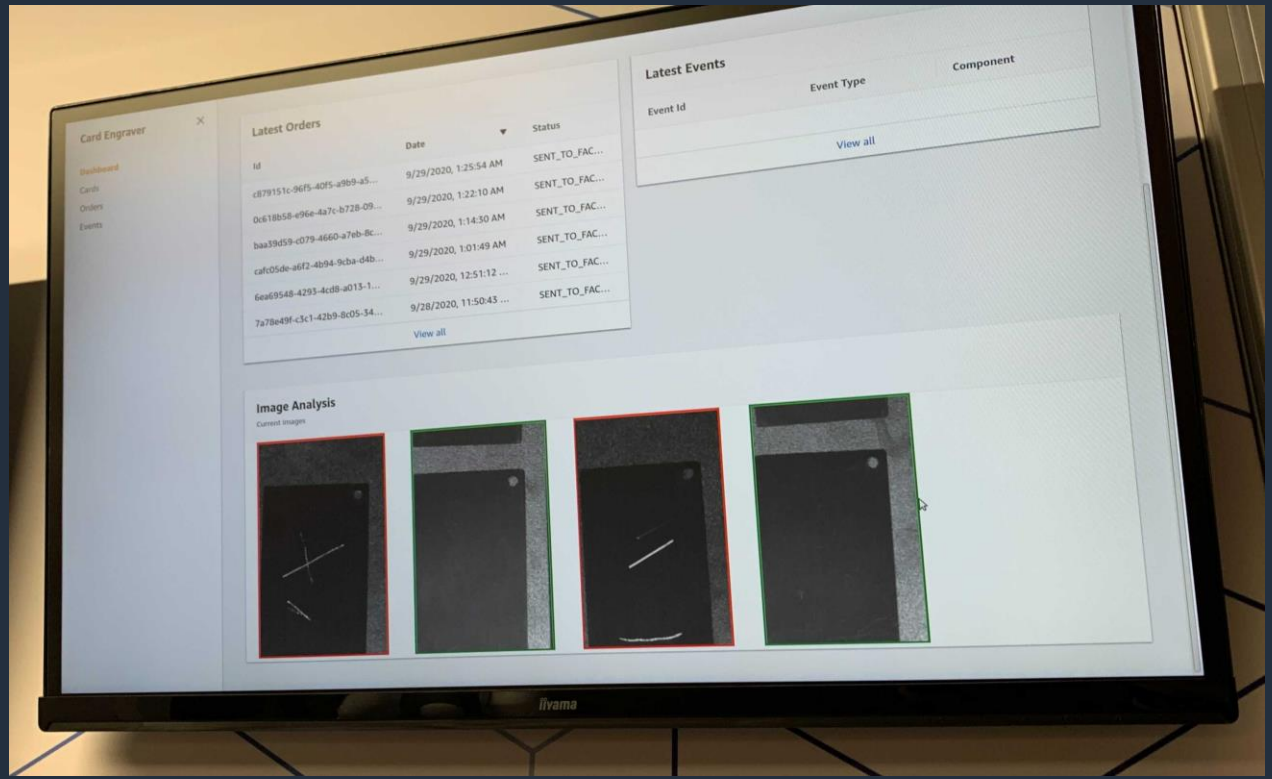
Machine data & ML Quality Detection



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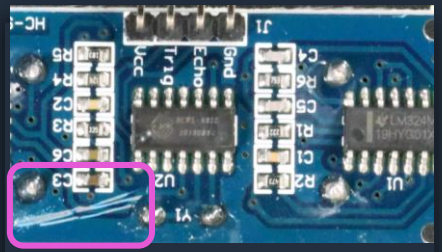
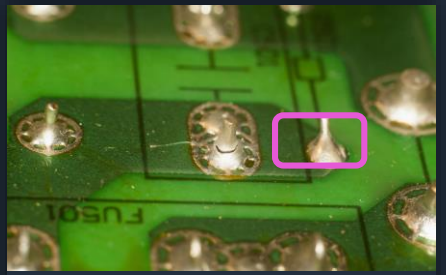
Use Case: Detect Product Defects

Anomaly	Surface defect	Surface defect	Improper solder (shape)
Example	Printed circuit board	Automotive Door	Printed circuit board





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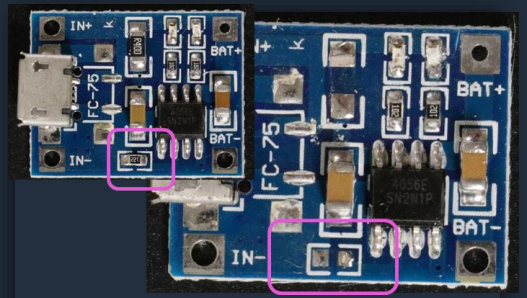
Use Case: Identify missing component



Anomaly	Absence/presence	Absence/Presence
Example	Printed circuit board	Blister pack

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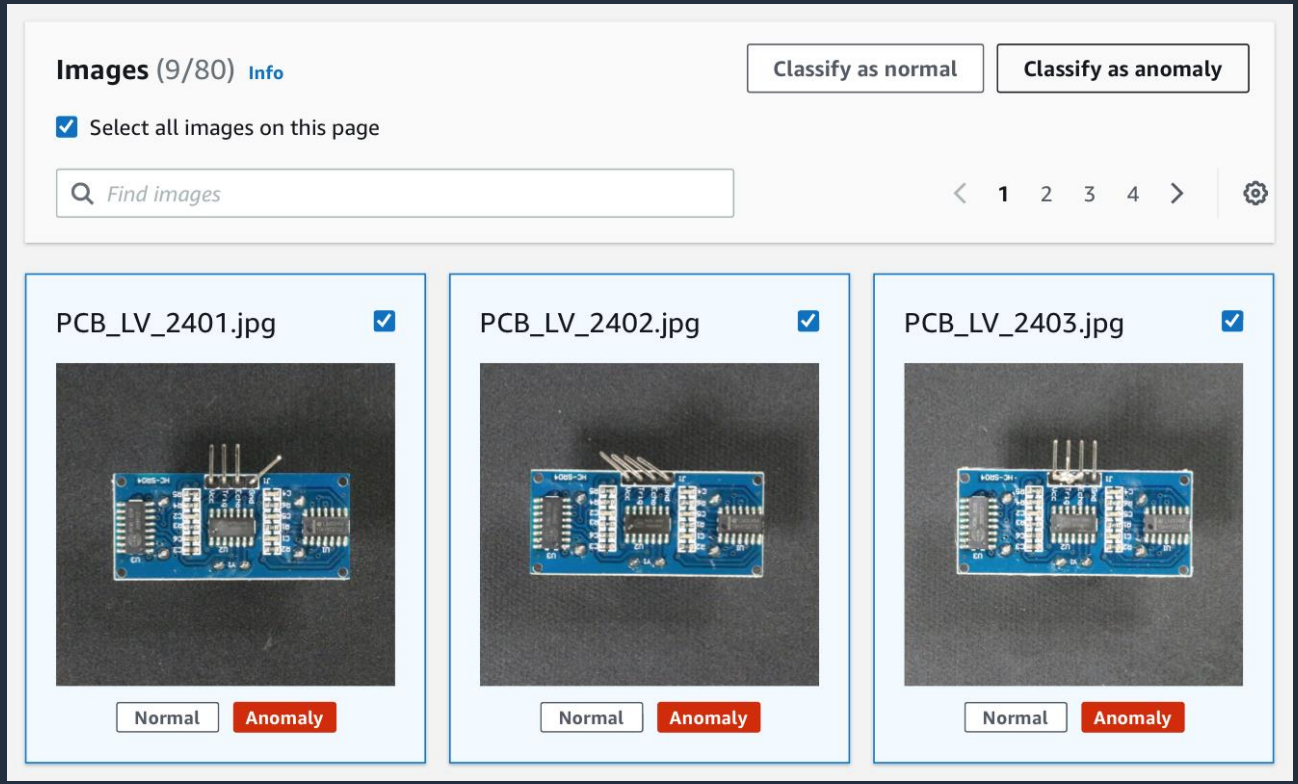
Simplified labelling



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Prototyping Area: Industrial Digital Twin Watertank Demo

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Our Use Case

Customer Challenge

- An industrial company needs to monitor their water tanks in treatment facilities:
  - State of the tanks (water level, leaks) and content (pH levels, ammoniac metering)
  - Raise alerts when anomalies are detected
- The systems are deployed in poorly accessible areas:
  - Operations require remote supervision to limit on-site intervention costs

AWS Approach

- IoT sensors deployed on the system send data to AWS Cloud
- A Virtual and Augmented Reality representation of the system provides real-time and intuitive monitoring for the Operations

Outcome

- Real-time remote monitoring of tanks inside facilities
- Cost reduction in terms of human manual interventions required

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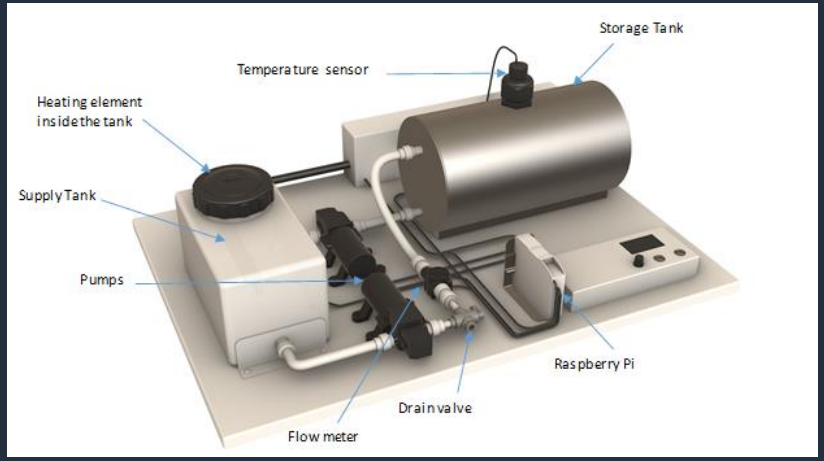
The Prototype

- A fully functioning water system including a supply tank, a storage tank and pumps to exchange water between the two reservoirs
- Monitors flow rates, volume, temperature, power consumptions and leaks



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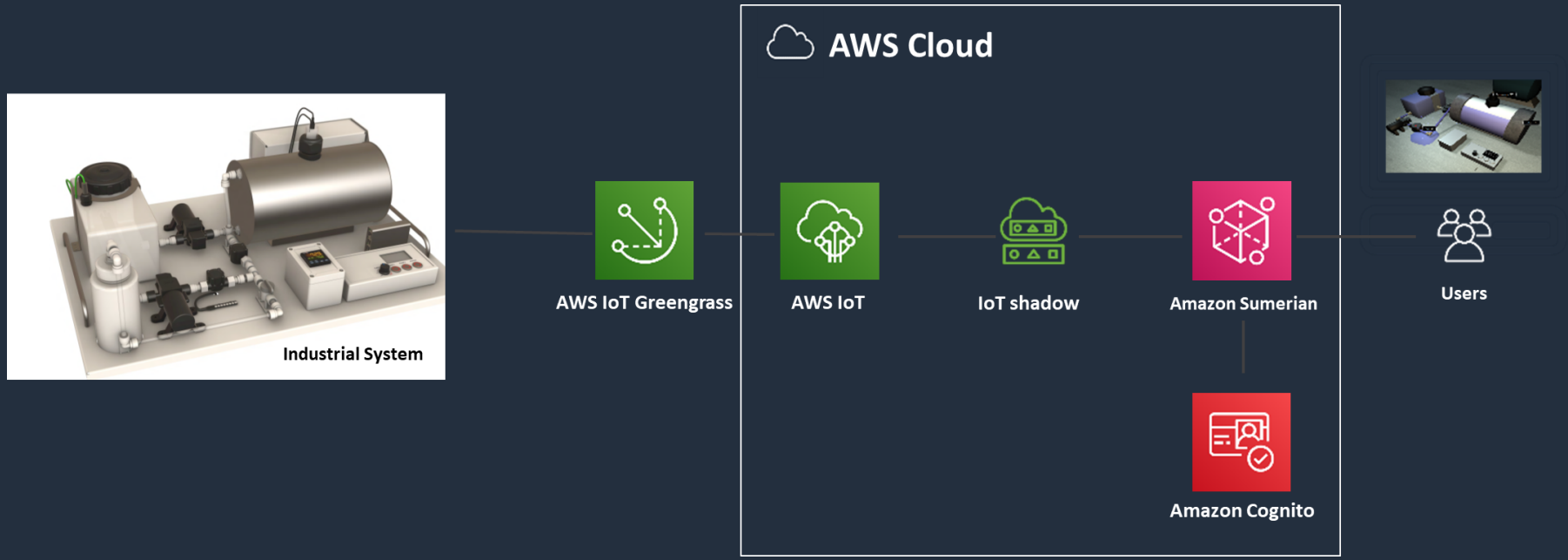
A closer look at the architecture



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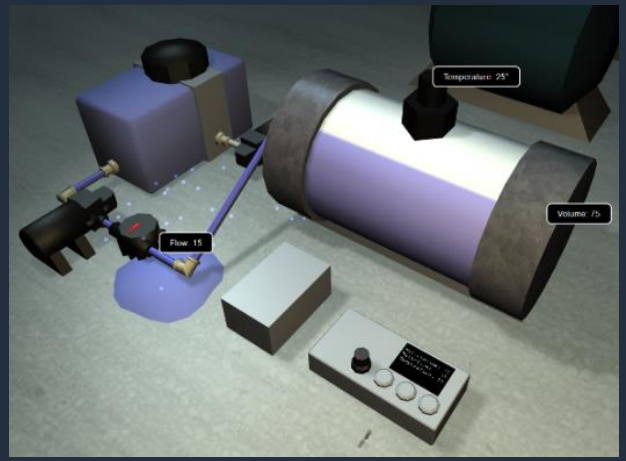
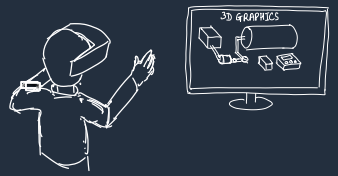
Demonstrator user experience





All events are generated live with the demonstrator:

- Water flow
- Volume & Temperature change in storage tank
- Leak

Real time visualization:

- 3D from a web browser
- VR using VR headset
- AR using smartphone
  - based on markers on the tank
  - or with a paper marker laid flat on a table when running without the demonstrator

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BMW Cloud Data Hub

Junjie Tang
Principal Consultant
March 23, 2021

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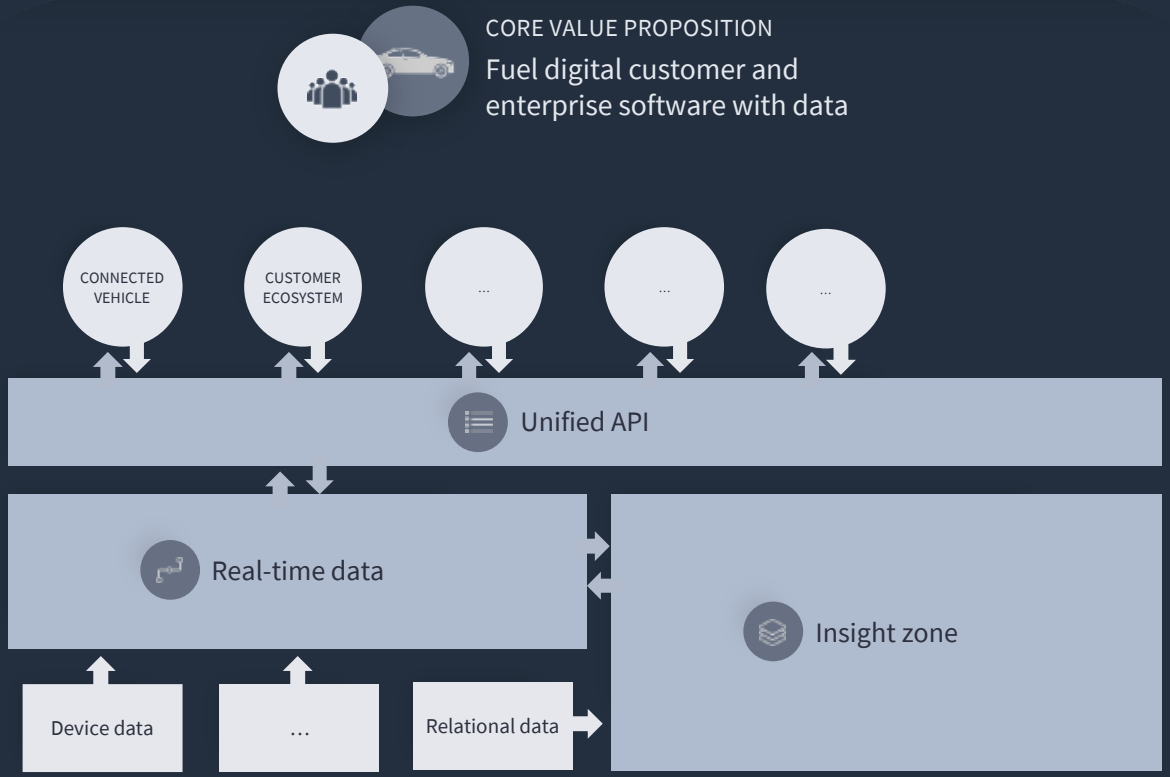
Cloud data hub in a nutshell



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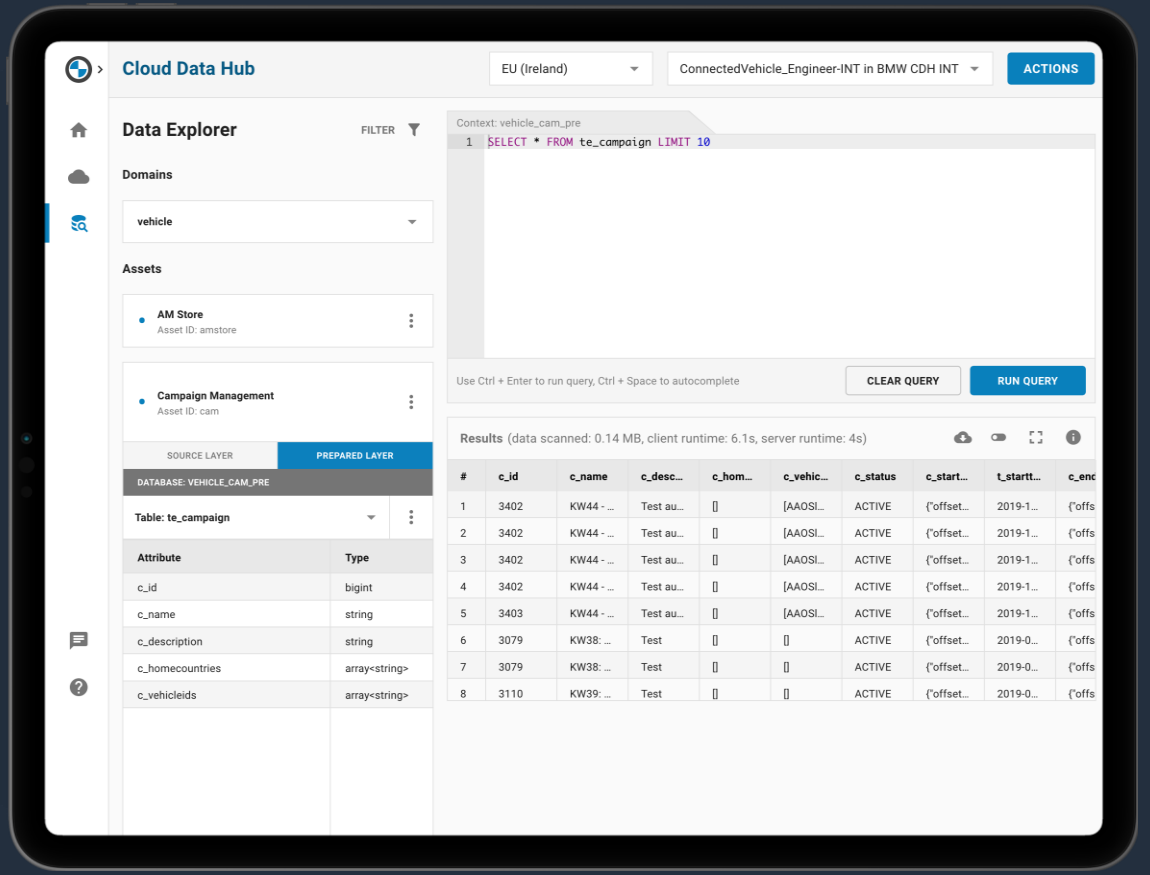
DATA.BMW.CLOUD

Explore data

Provide and consume data

Manage data



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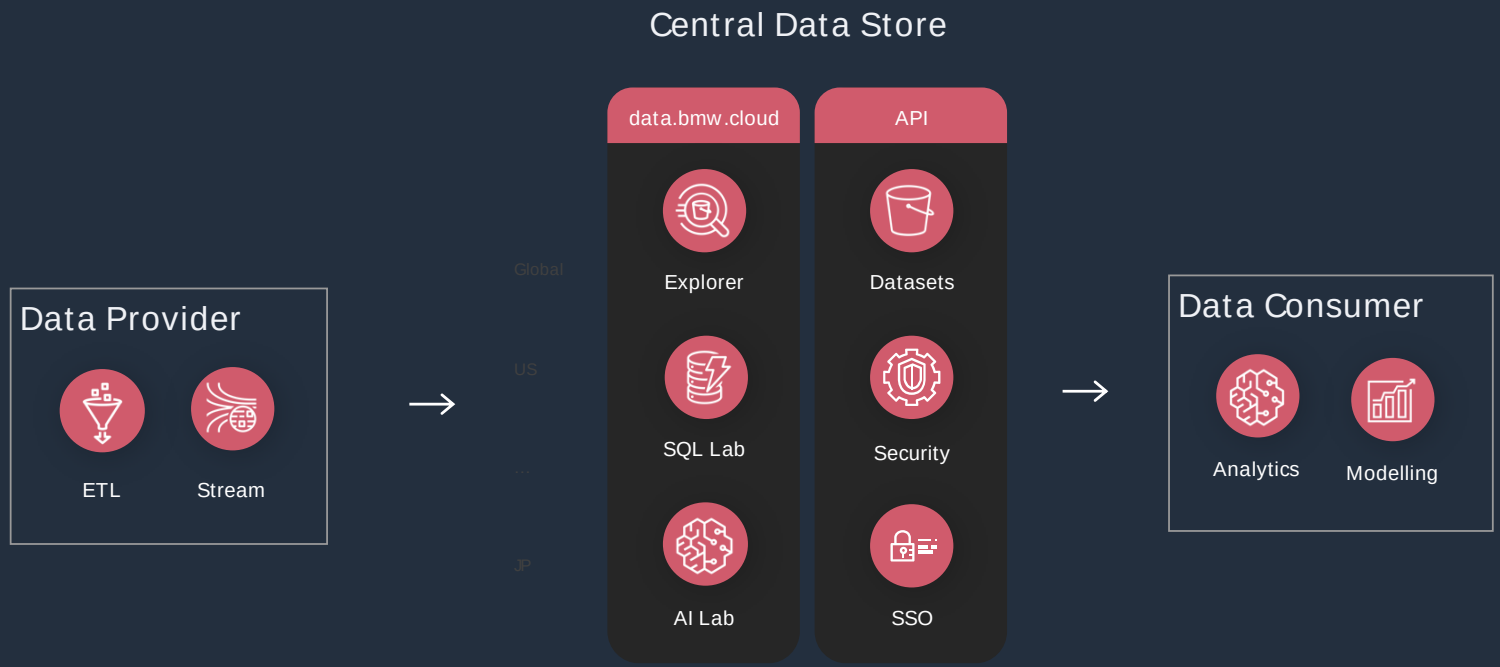
MULTI-ACCOUNT SETUP HELPS democratize DATA WORKLOADS



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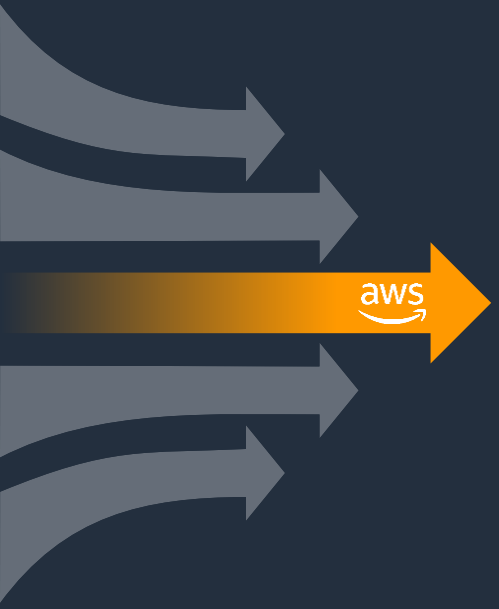
AWS Resources



- Factory visit / Amazon FC visit
- Co-Creation workshop
- Working Backwards workshops
- PR/FAQ

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Additional Resources:

- Showroom Website: request dedicated tours and workshops here
- Bundesliga Case Study
- Kärcher Case Study
- BMW Case Study
- Amazon Rekognition for Personal Protective Equipment
- Amazon Lookout for Vision
- AWS in der Fertigungsindustrie
- Intelligente Fabrik – Fertigungsbetrieb in der Cloud
- Smart Factory optimization in the cloud
- Cloud-enabled Smart Factory

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