1

Machen Sie mehr aus Ihren Daten!

Azure IoT Suite

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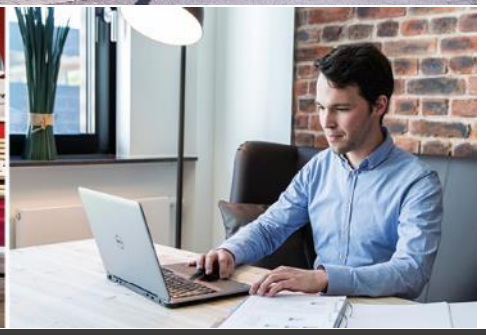


Fakten:

- Seit 1999
- Spezialist für Data-Warehouse, Big-Data- & Data-Analytics-Lösungen
- 73 Mitarbeiter
- Top kununu-Bewertungen 4,4
- 70.000 Beratertage Erfahrung
- 700 Einzelprojekte

Microsoft Partner
Microsoft
Gold Data Analytics
Gold Data Platform
Gold Cloud Platform

HORTONWORKS®

Auszeichnungen:

- Microsoft Gold Kompetenz Data Analytics
- Microsoft Gold Kompetenz Data Platform
- Microsoft Silber Kompetenz Cloud Platform
- Microsoft Frontline Partner of the Year (2012)
- Zertifizierung nach Hichert/IBCS

Unser Portfolio

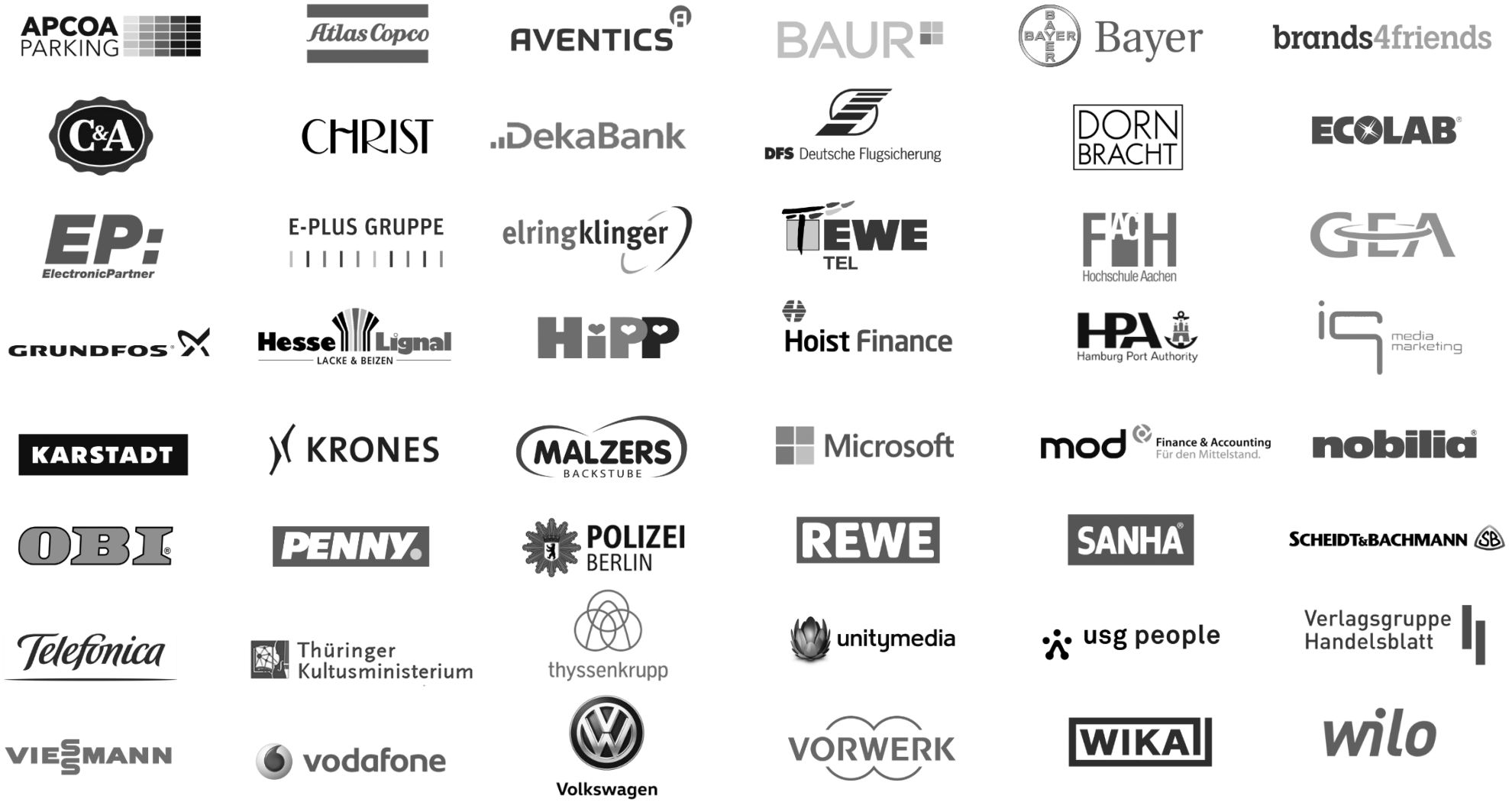
Data Analytics Platform

BI und Big Data werden in Unternehmen oftmals als getrennte Themen betrachtet. Jedoch ist es in vielerlei Hinsicht sinnvoller, die beiden Welten zu vereinen. Mit der ORAYLIS Data Analytics Platform bauen wir für Sie eine flexible DWH-Architektur auf, die genau auf Ihre Anforderungen zugeschnitten ist und in alle Richtungen erweitert werden kann.

Data Driven Innovation

Stetig wachsende Datenbestände bieten das Potenzial für innovative Produkte und Dienstleistungen. Im ORAYLIS Business Innovation Labs erforschen wir gemeinsam Ihre Daten nach Erkenntnissen, die eine digitale Transformation Ihres Geschäfts sowie Vorteile gegenüber dem Wettbewerb ermöglichen.

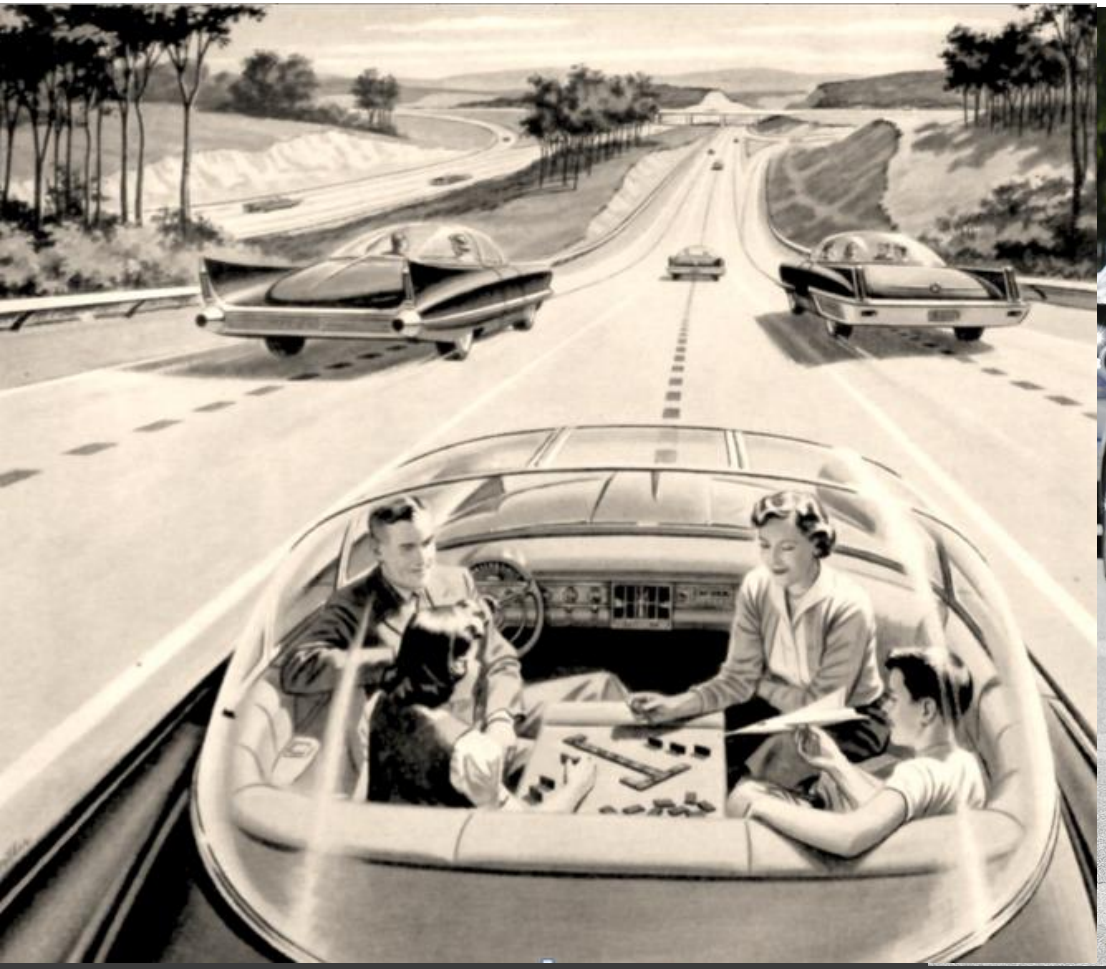
Unsere Kunden



IoT

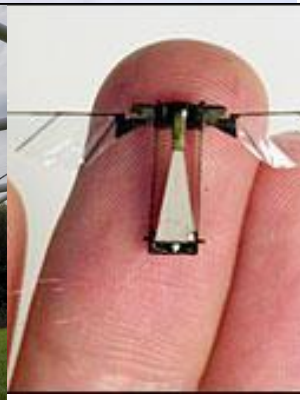
„Every industry is now a software industry where they are building these systems of intelligence… provide SaaS services that go along with your products.“ - Nadella

Dream for decades… will it ever come true?

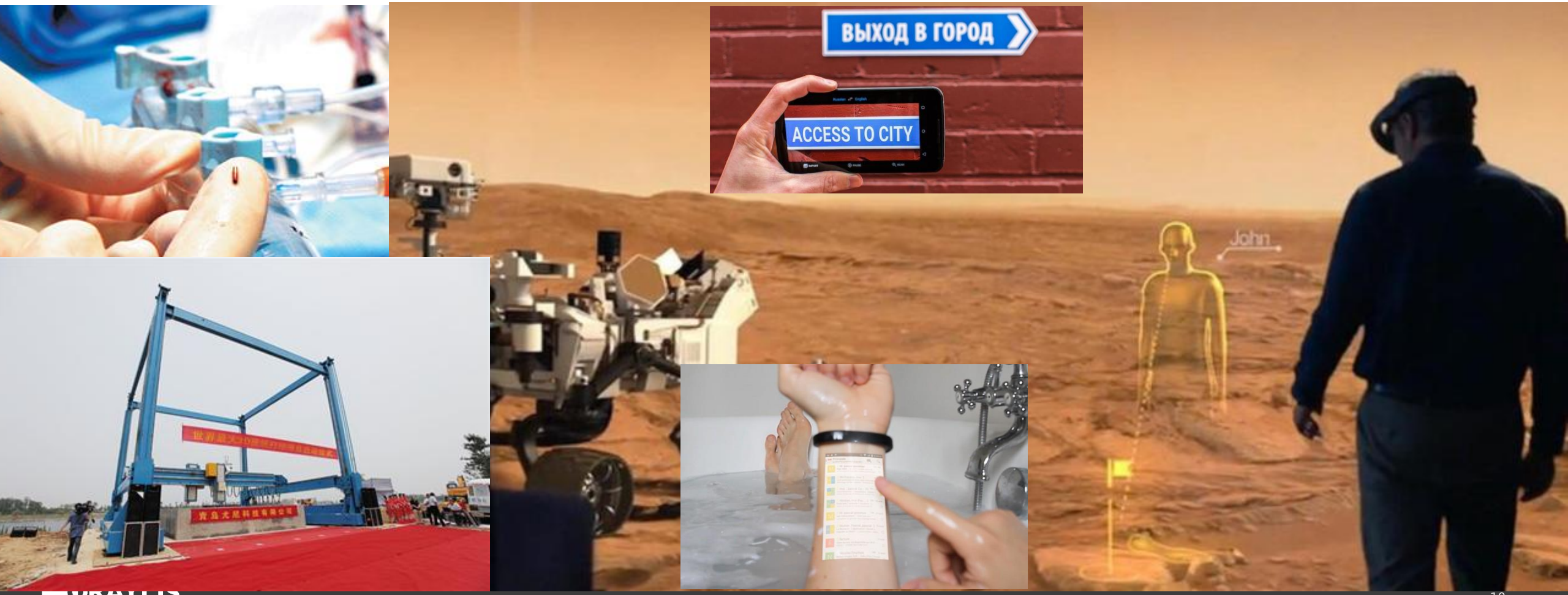


Dream for decades… will it ever come true?

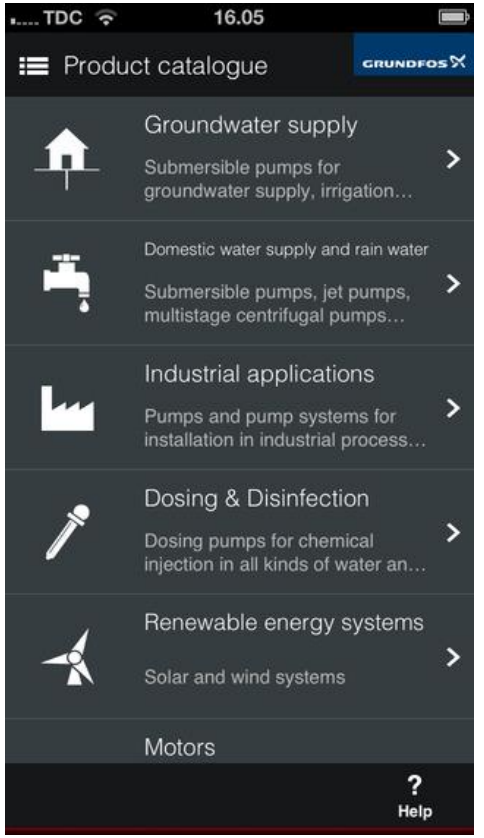
Kevin Kelly, founder of Wired Magazine: Singularity is the point at which "all the change in the last million years will be superseded by the change in the next five minutes."



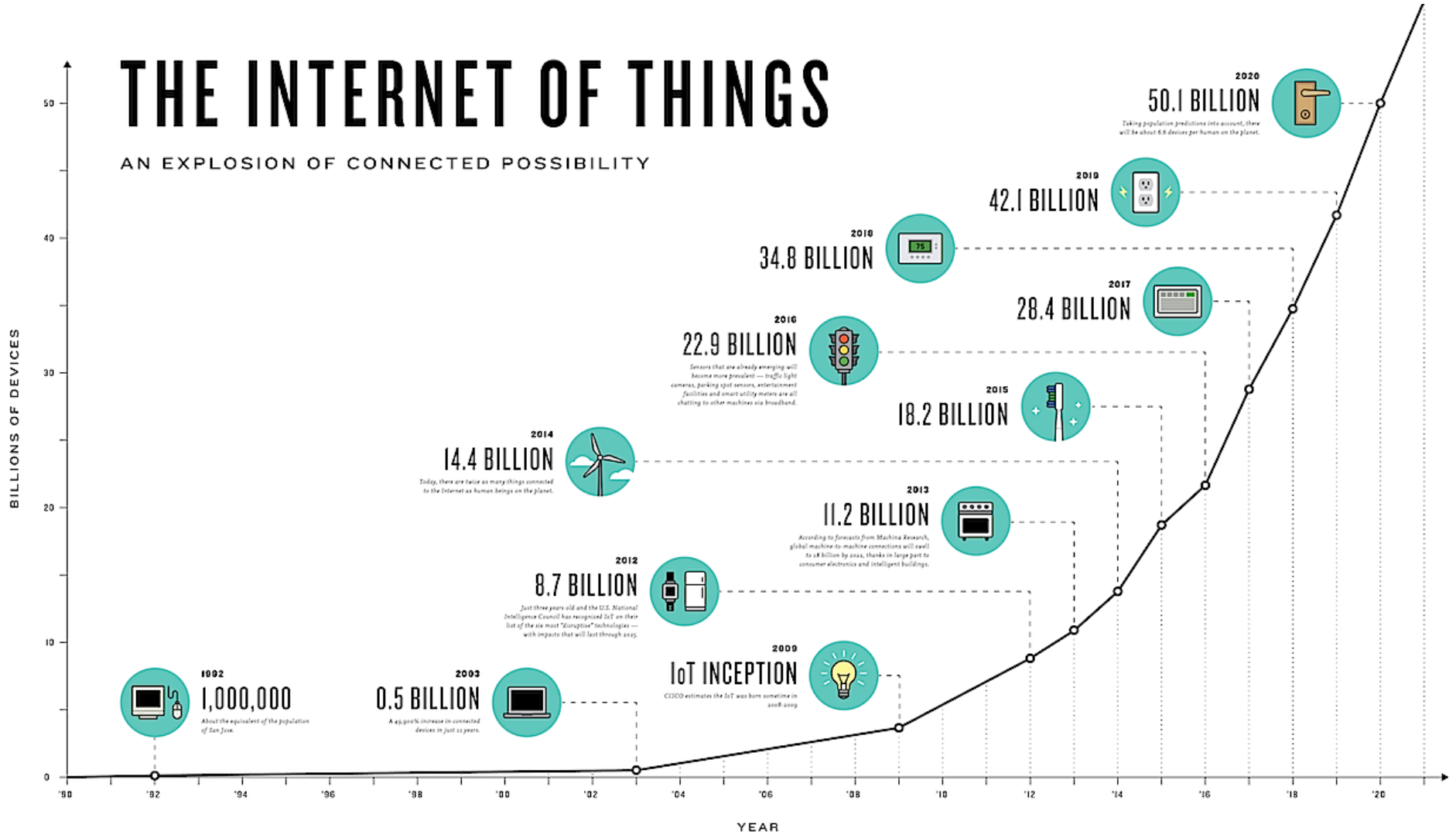
Competing over Analytics has become more important than Competing over Products



Competing over Analytics has become more important than Competing over Products

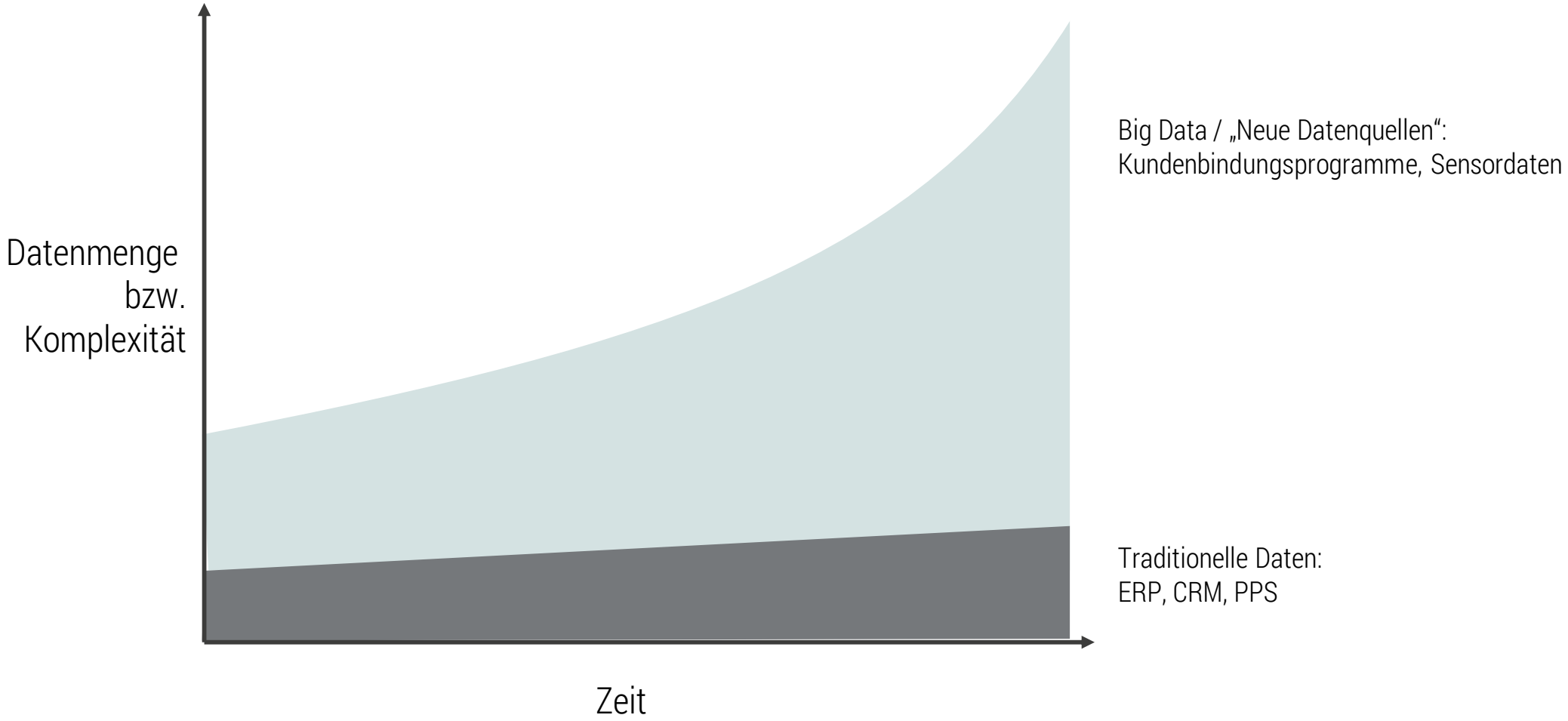


Internet of Things Prognose

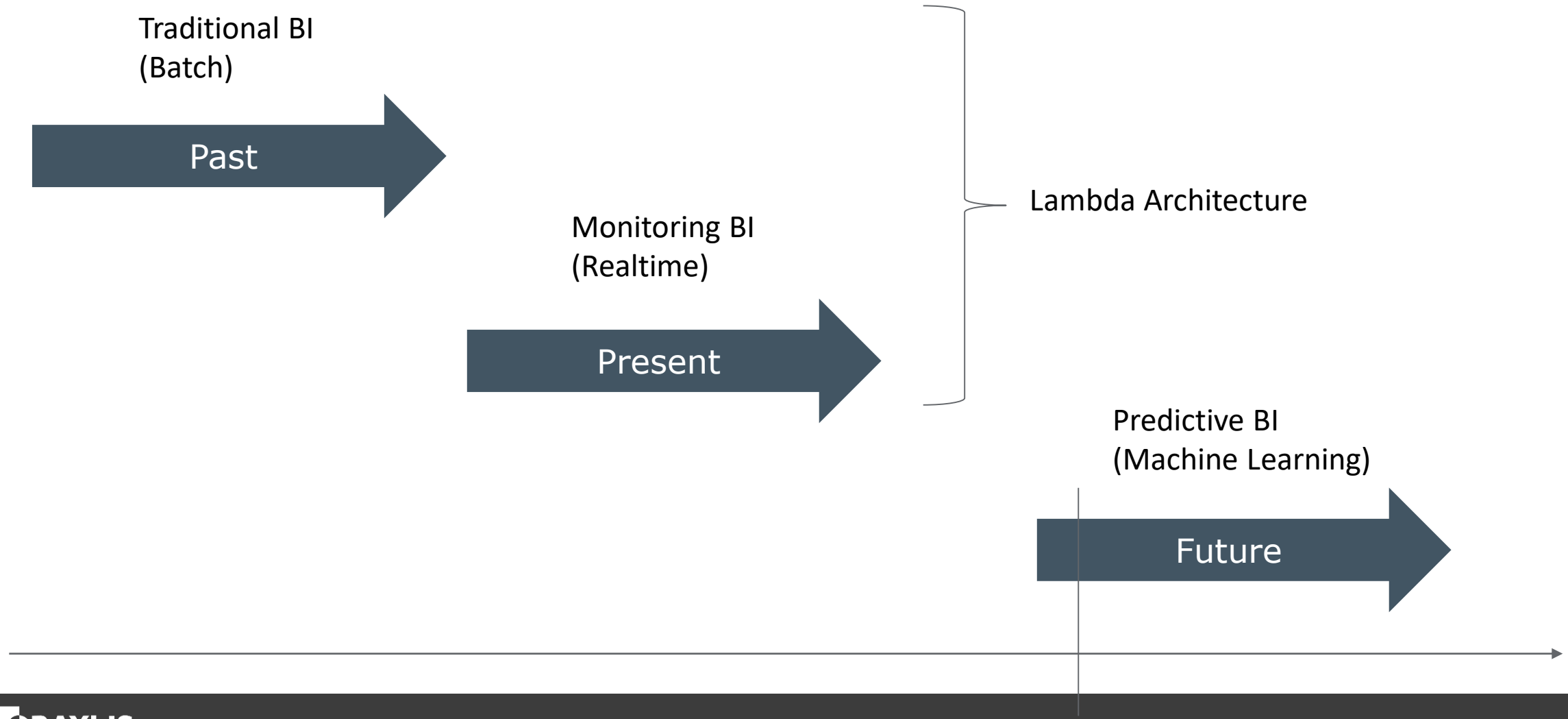


(Bild: theconnectivist)

Traditionelle Daten vs. Big Data

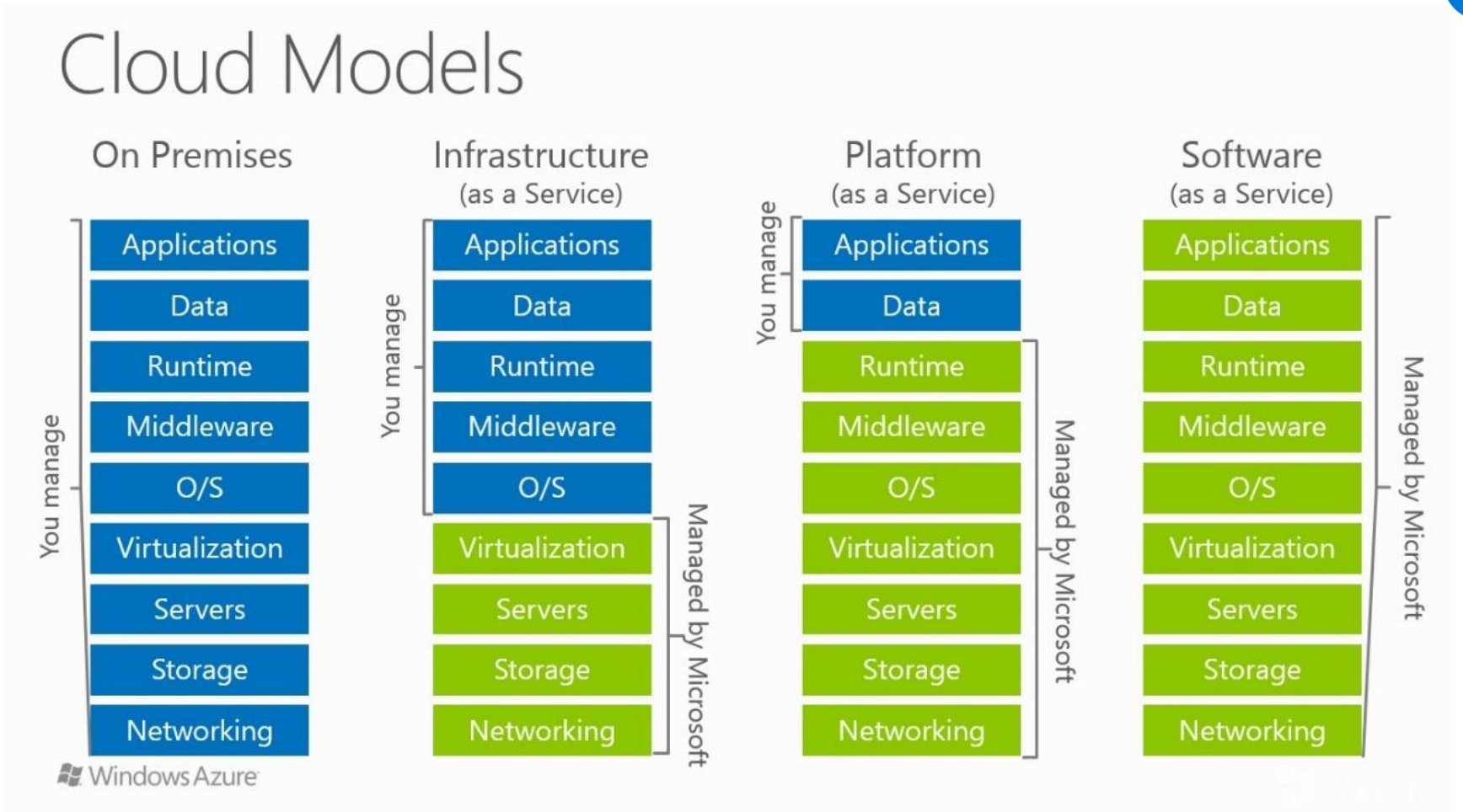


From the Realtime Enterprise to the Predictive Enterprise



IoT Suite

Cloud != Cloud

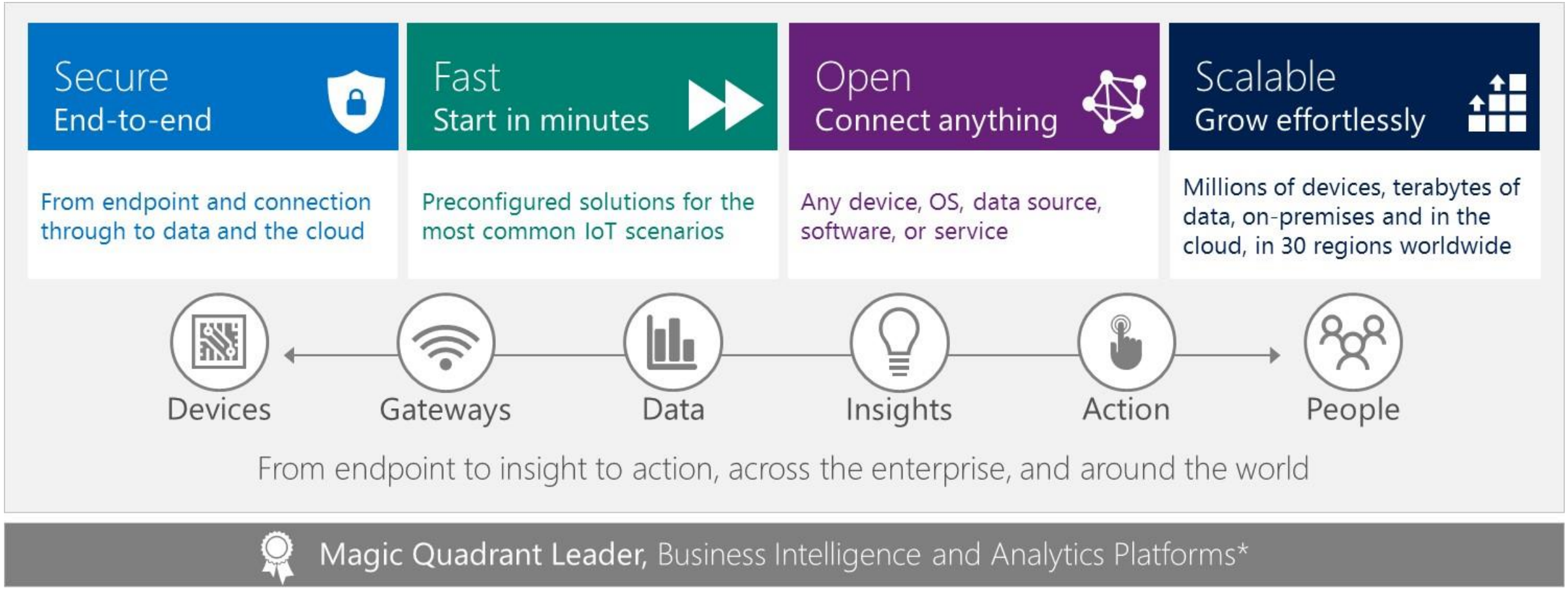

Cloud Models
On Premises
Infrastructure
(as a Service)
Platform
(as a Service)
Software
(as a Service)
You manage
Managed by Microsoft
Applications
Data
Runtime
Middleware
O/S
Virtualization
Servers
Storage
Networking
Windows Azure

Democratization of Technology – Now it‘s just about the Business Idea

Democratization disrupts this exclusivity with products that are often less expensive, integrate more easily in the corporate datacenter and, importantly, are accessible to mainstream information workers and developers using the skills they already have.

IoT Suite = Solution Accelerator

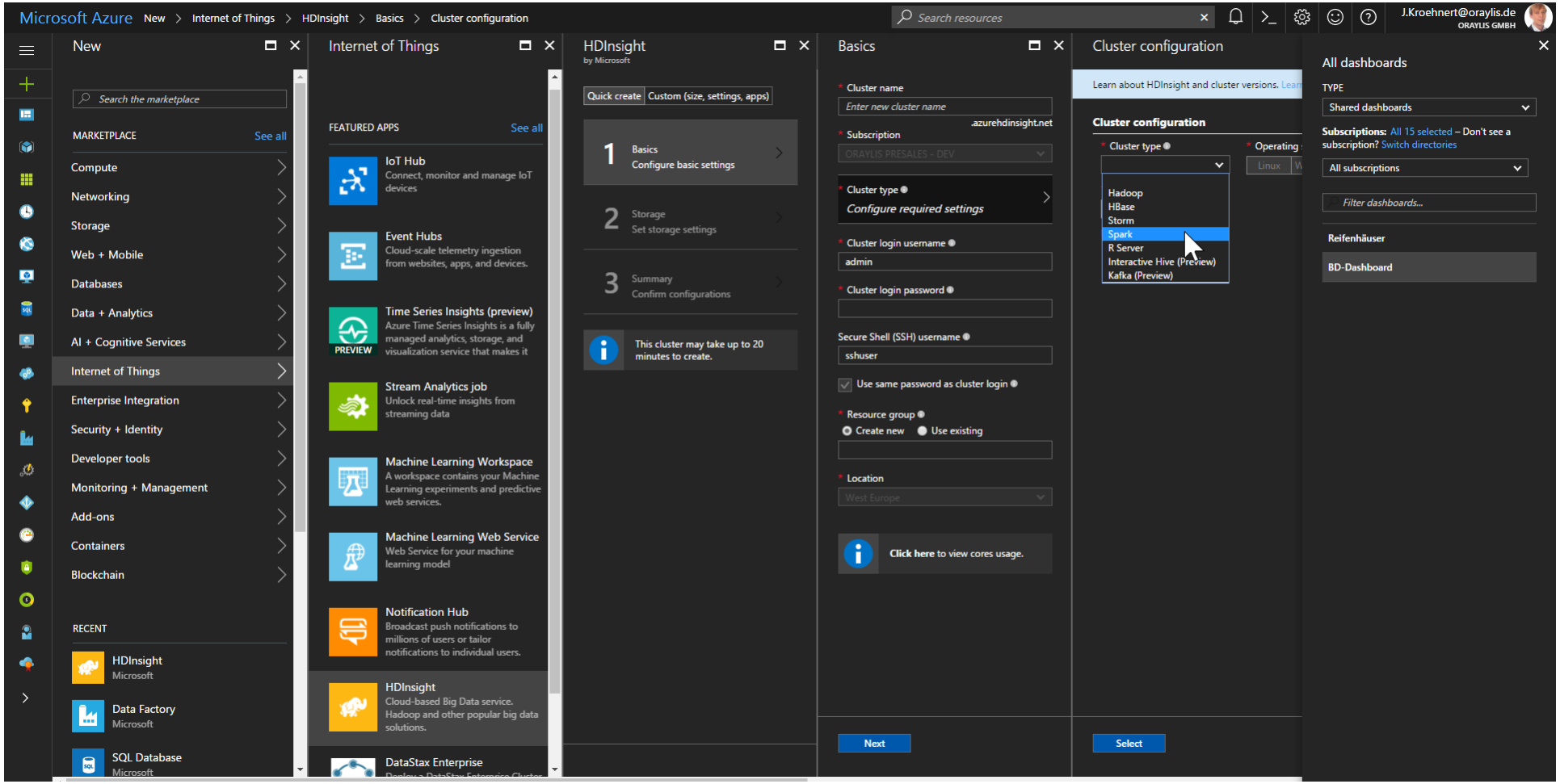
It's not a service. It's a solution accelerator.



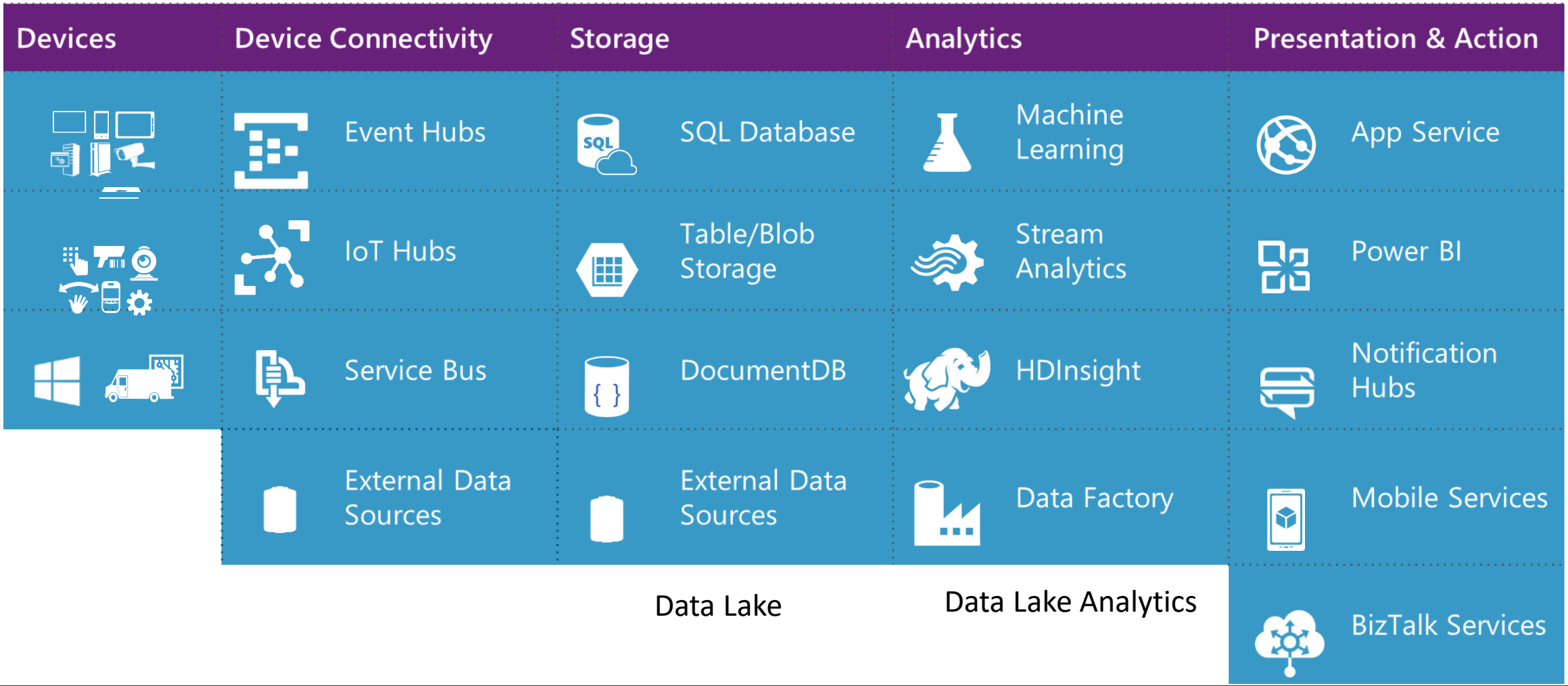
Magic Quadrant Leader, Business Intelligence and Analytics Platforms*

Built on the **industry's leading cloud**

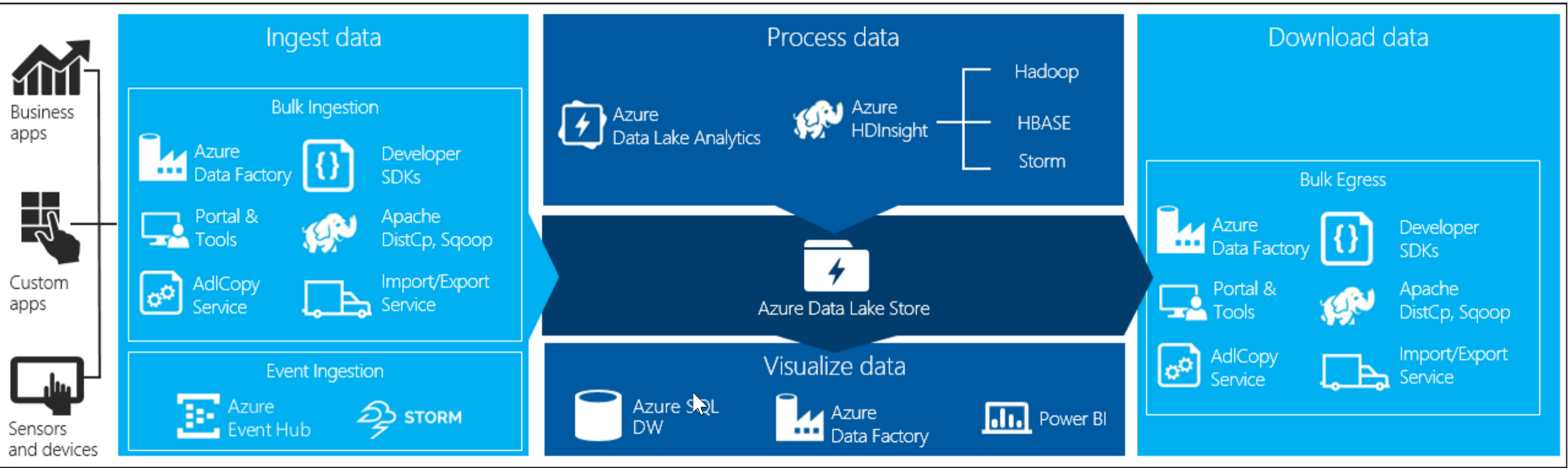
Microsoft Azure Portal



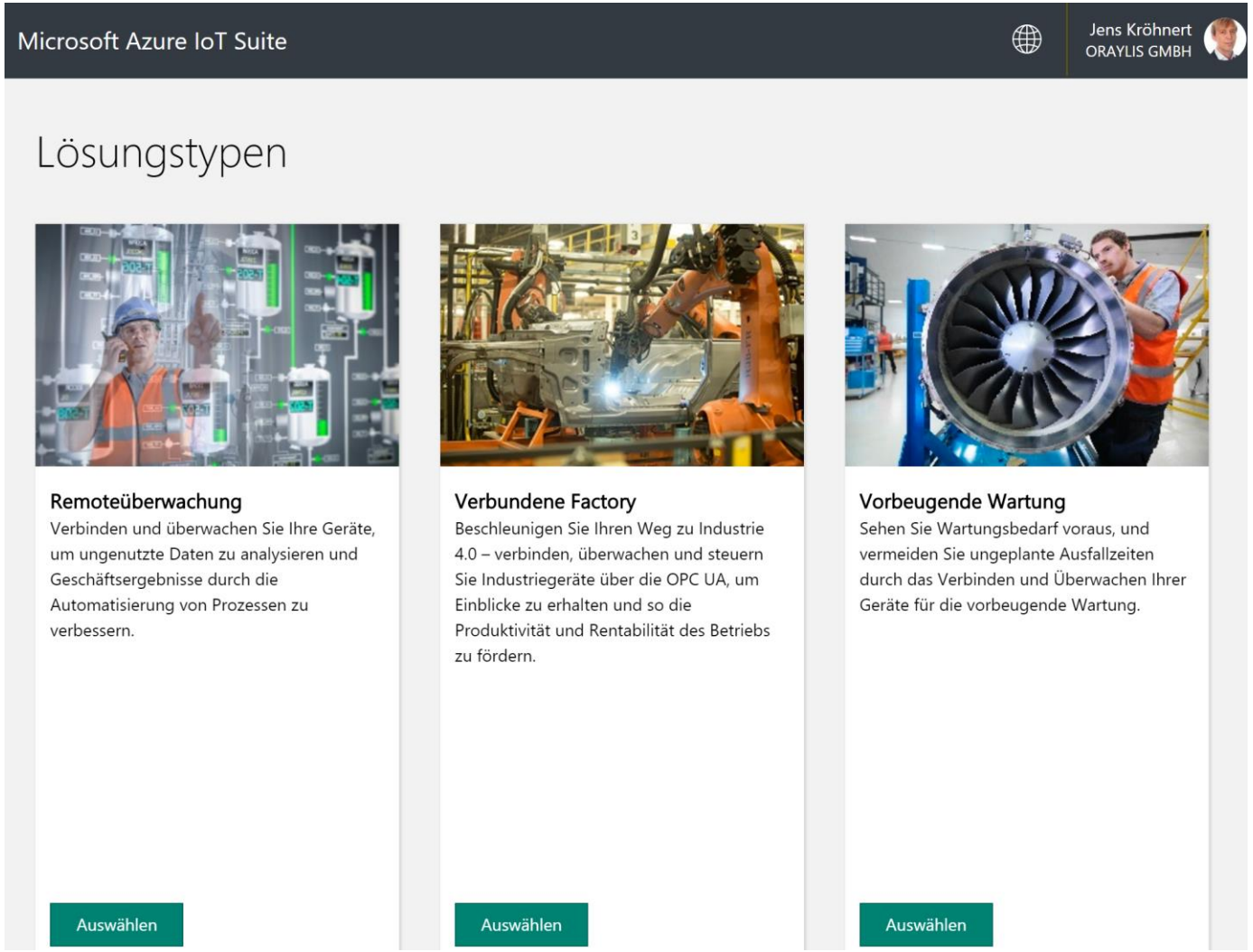
Microsoft Azure IoT Services



Microsoft Azure Data Lake



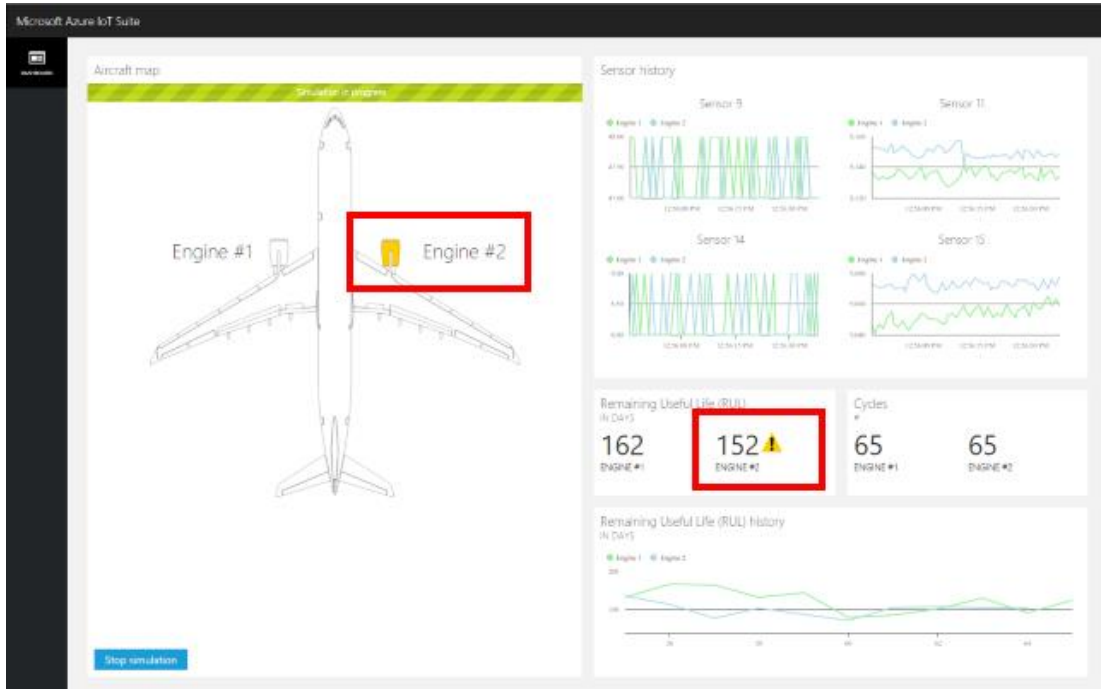
IoT Suite: Vorkonfigurierte Lösungen

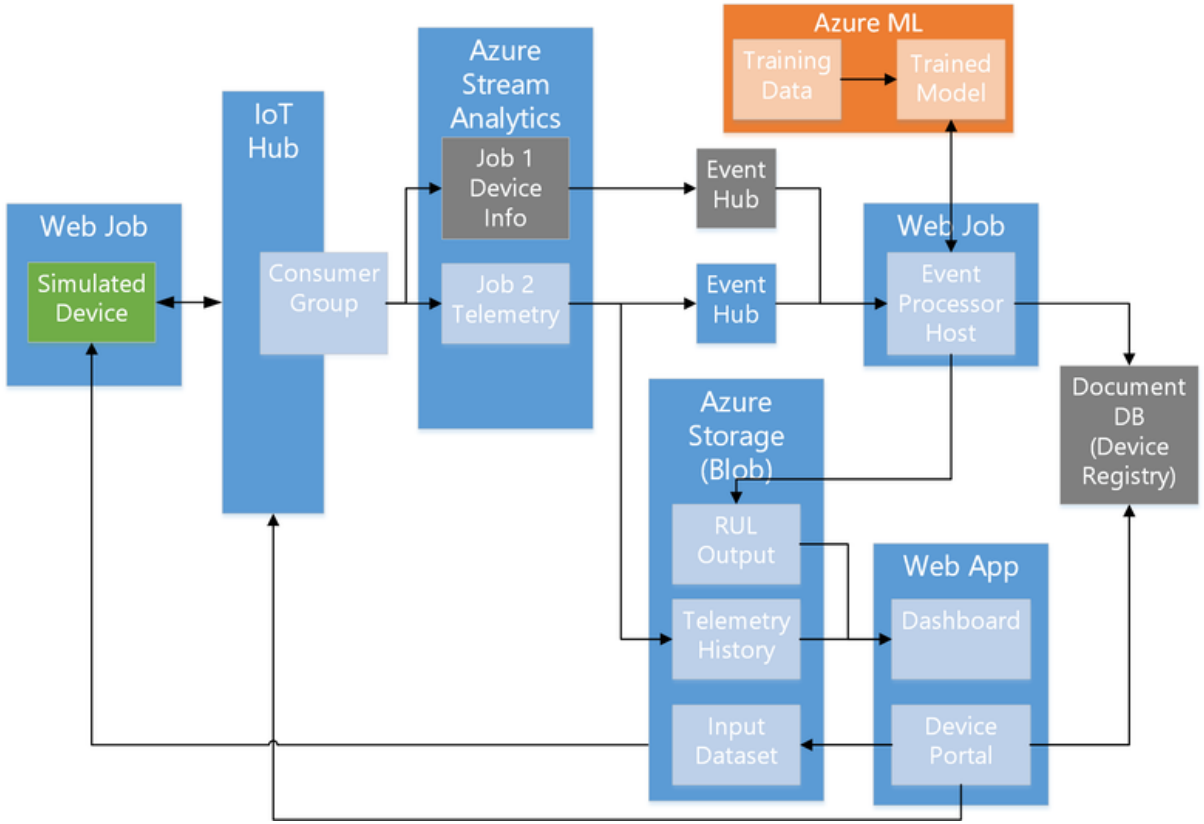


IoT Suite: Vorkonfigurierte Lösung vs. Manuelle Architektur

Vorkonfigurierte Lösung: Predictive Maintenance

- Ausgabedaten von Stream Analytics-Aufträgen in der Blob Storage-Einheit
- Restlebensdauer und Zyklusanzahl pro Flugzeugtriebwerk

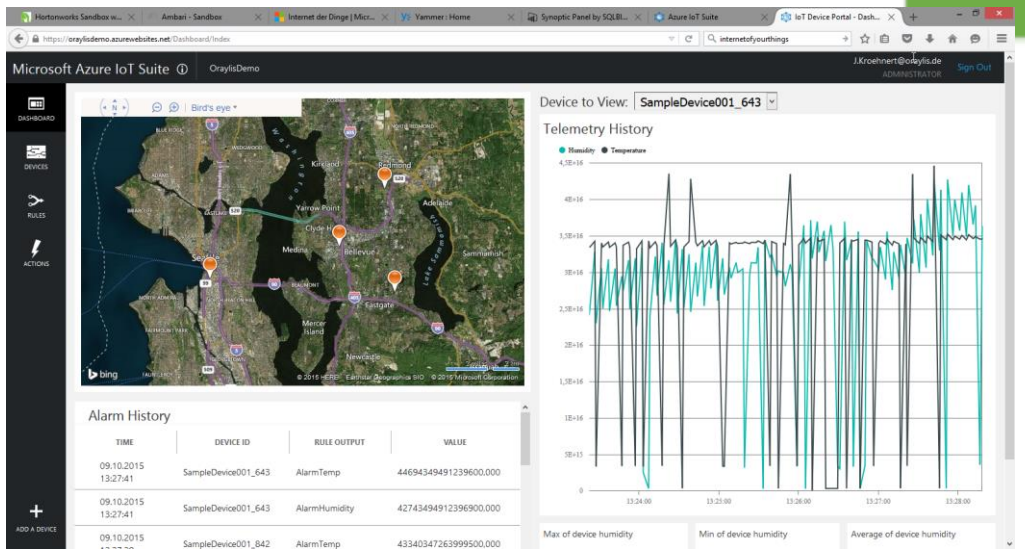


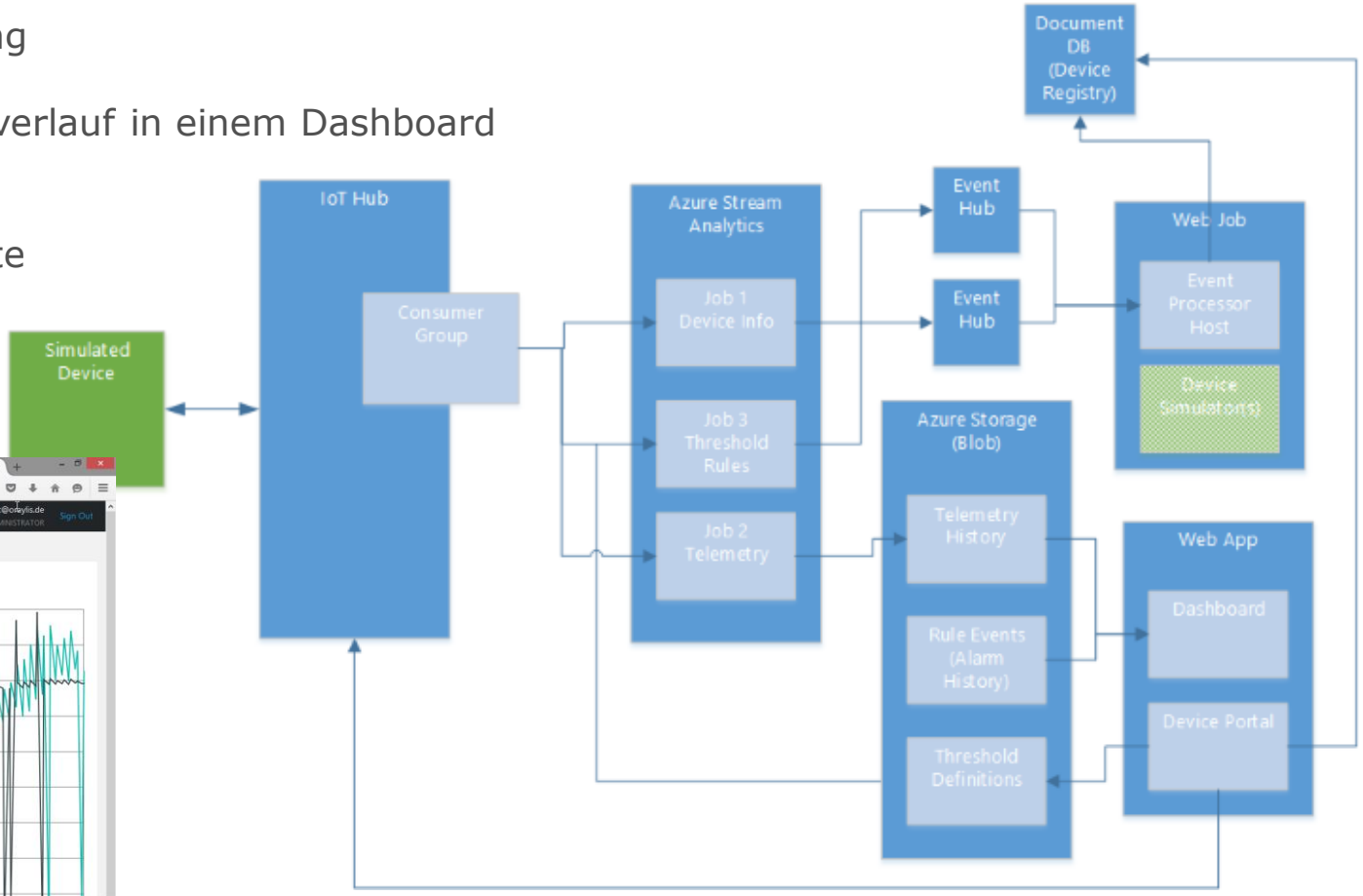


IoT Suite: Vorkonfigurierte Lösung vs. Manuelle Architektur

Vorkonfigurierte Lösung: Remoteüberwachung

- Anzeigen von Telemetriedaten und Alarmverlauf in einem Dashboard
- Bereitstellen von neuen Geräten
- Verwalten und Überwachen von Geräten
- Senden von Befehlen an bestimmte Geräte
- Verwalten von Regeln und Aktionen

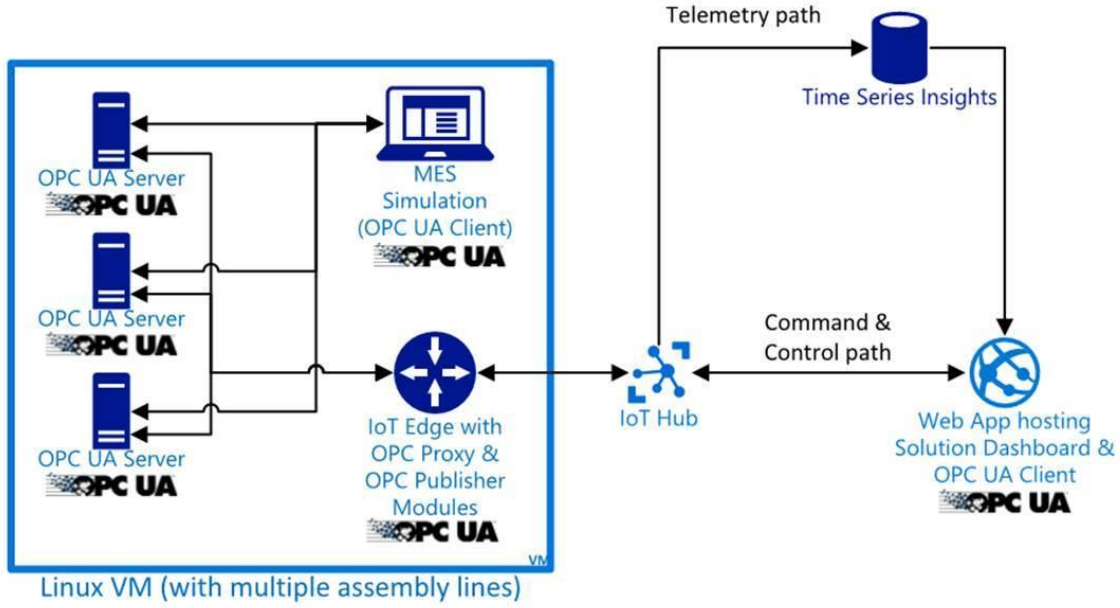


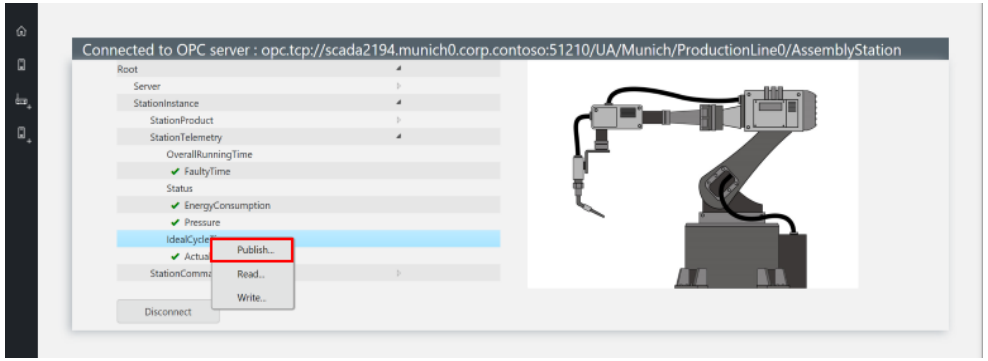


IoT Suite: Vorkonfigurierte Lösung vs. Manuelle Architektur

Vorkonfigurierte Lösung: Connected Factory

- Verbinden von OPC UA Servern über Azure IoT Gateway
- Einfache Auswahl von OPC Messpunkten zur Übernahme
- Direkte feingranulare Analyse in Azure Time Series Insights
- OPC Calls zur Remote Steuerung
- Konfigurierbares Portal





Lambda Schritt 1: Realtime – Hot Path

Mitmach-Demo mit Ihrem Smartphone

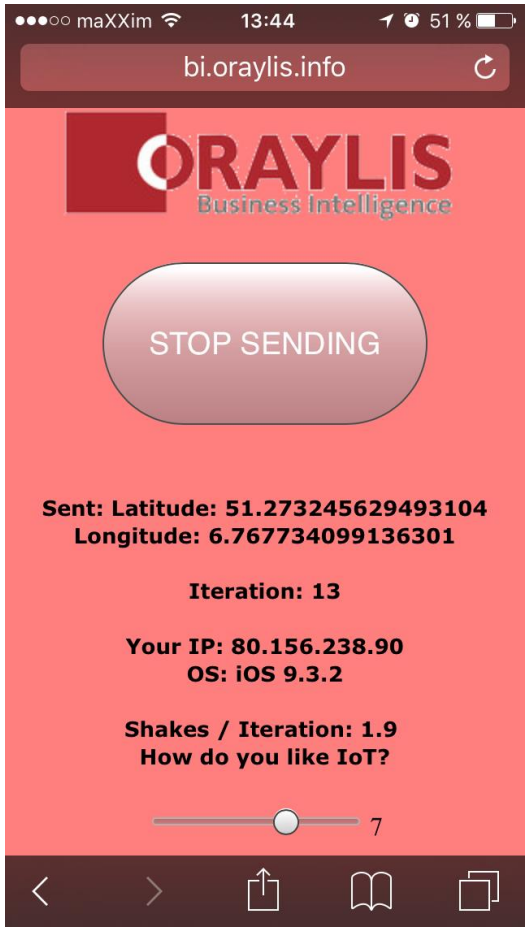
https://bi.oraylis.info/usg

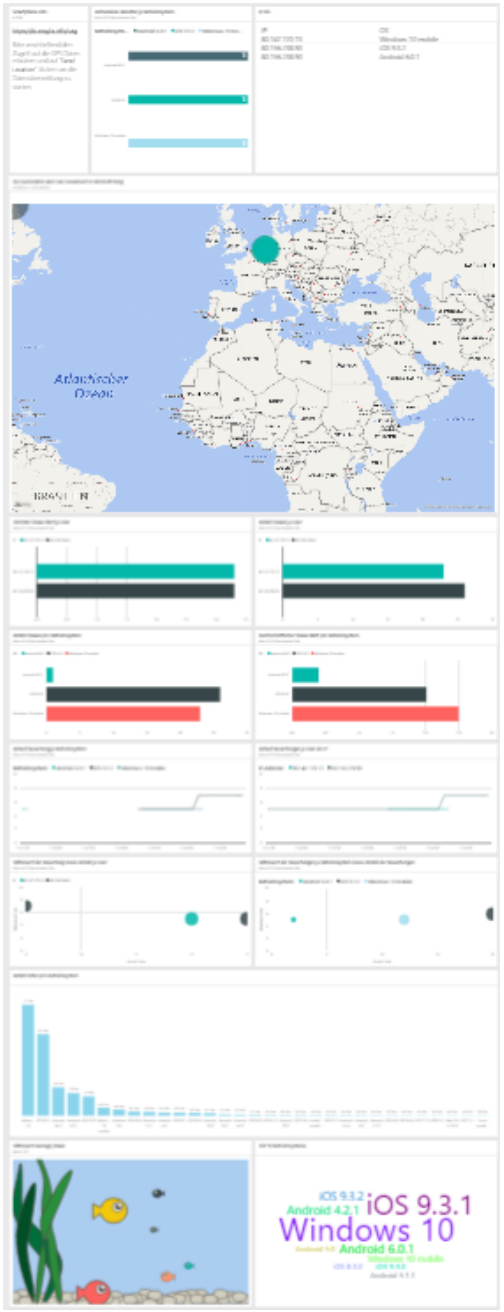
Im Browser ihres Smartphones eingeben

Geokoordinaten auf Anfrage erlauben

START SENDING drücken

Alle 10 Sekunden wird dann gesendet (Iterationen)





Field-Gateway Architektur

Betriebssystemplattformen

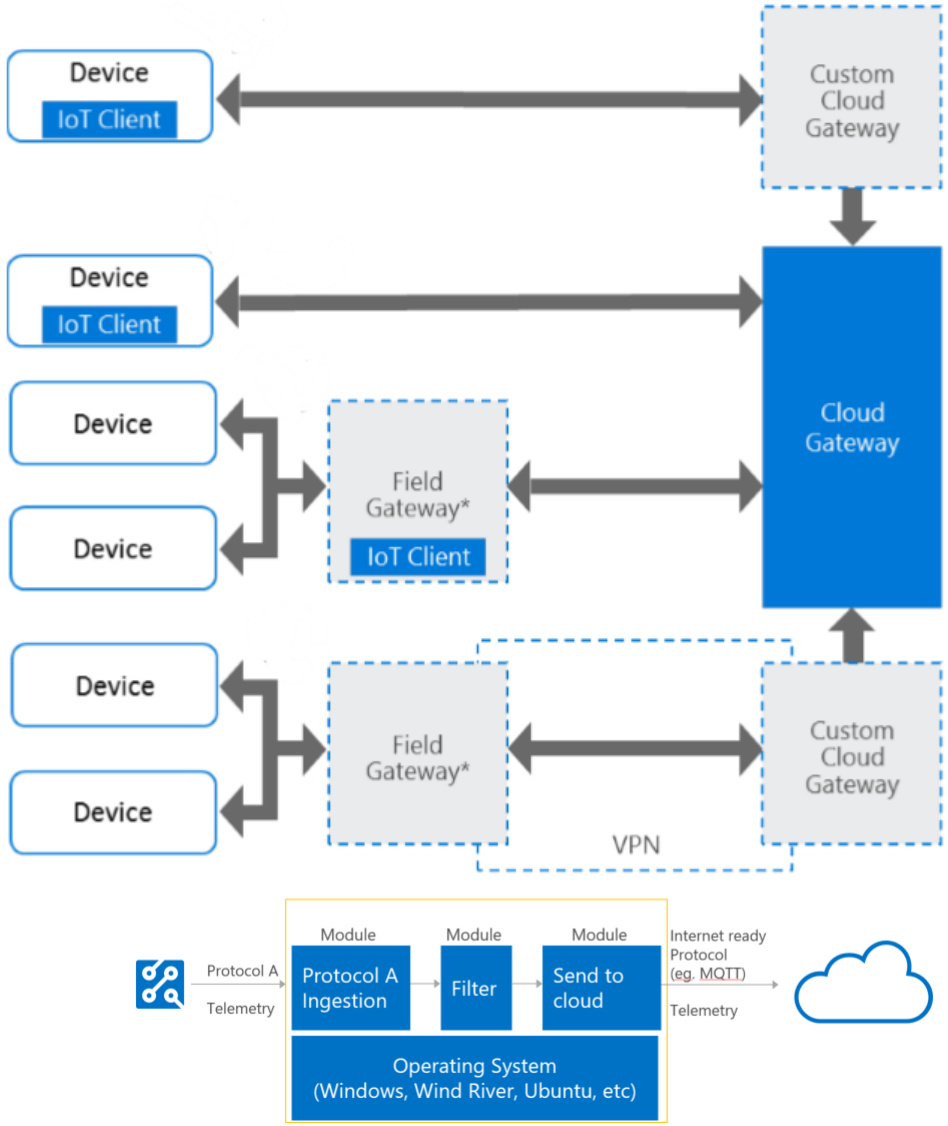
Die Azure IoT-Bibliotheken wurden auf den folg

Linux-/UNIX-Betriebssystemplattformen
Debian Linux
Fedora Linux
Raspbian Linux
Ubuntu Linux
Yocto Linux

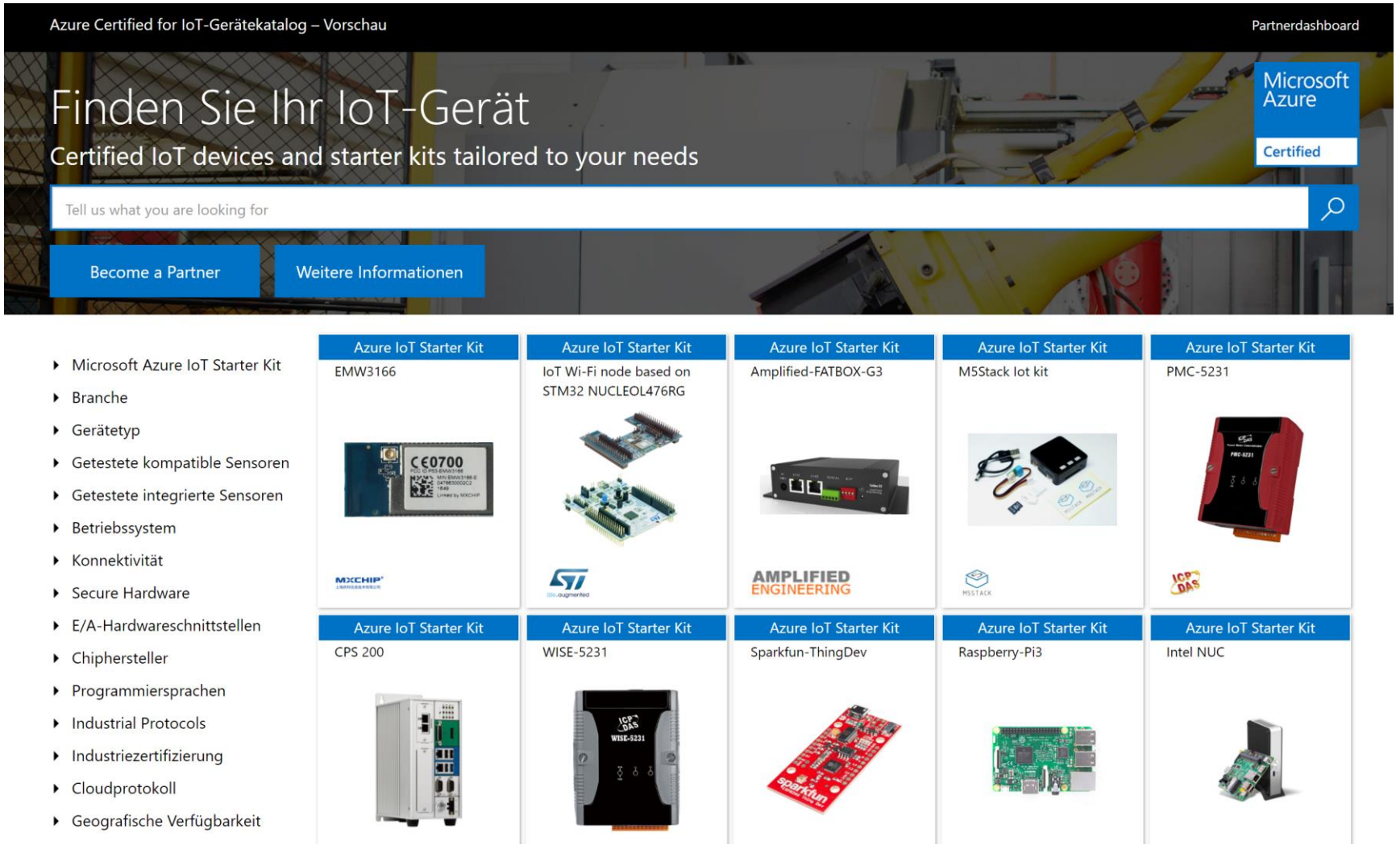
Windows-Betriebssystemplattformen	Version
Windows Desktop	10
Windows IoT Core	10
Windows Server	2012 R2

Andere Plattformen	Version
mbed	2.0
TI-RTOS	2.x

NEXCOM NISE 50C	Windows 10 IoT Core	C#
Pacific Control Systems G2021ES	Ubuntu	C
PANASONIC Toughpad FZ + F1	Windows 10 IoT Mobile Enterprise	C#
Raspberry Pi 2	Raspbian	C, JavaScript, Java
Raspberry Pi 2	Windows 10 IoT Core	C, JavaScript, C#
Samsung ARTIK	Fedora	C
SOTEC CloudPlug	YOCTO	C
TI CC3200	TI-RTOS 2.x	C
Toradex Apalis iMX6	Linux Angstrom(Yocto)	JavaScript, Java



IoT Device Katalog



https://catalog.azureiotsuite.com/

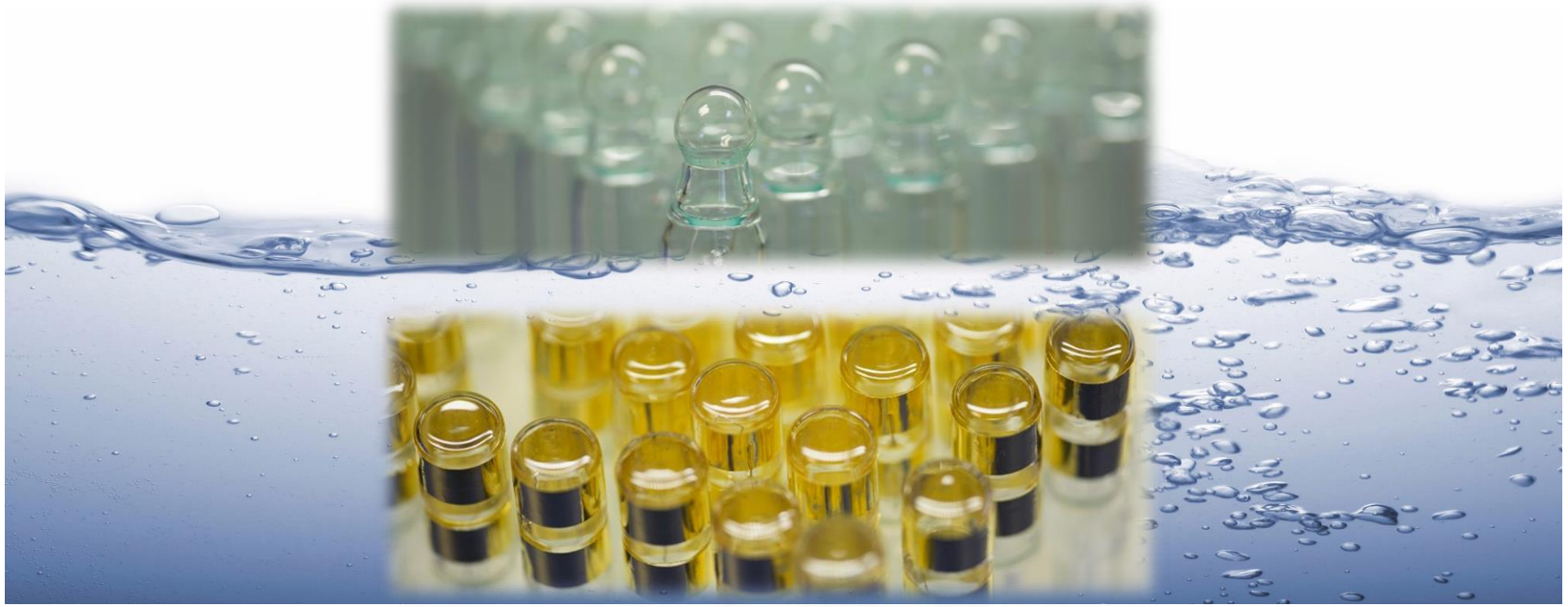
Oraylis Referenzprojekt IoT

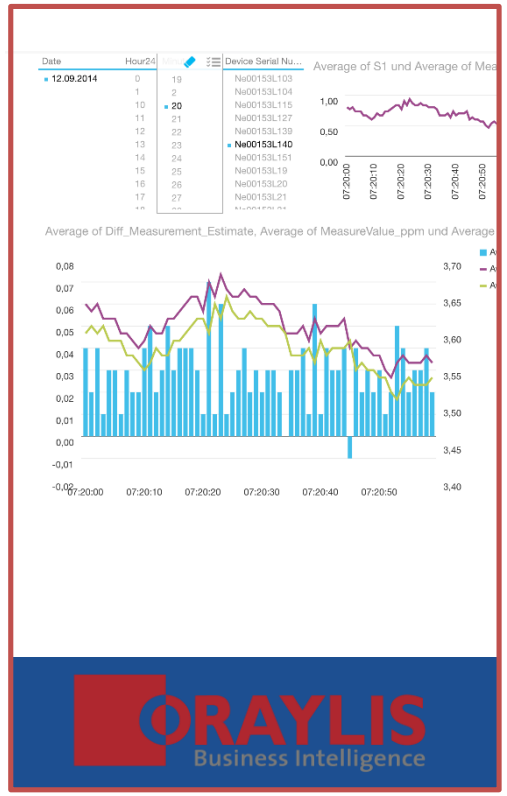
- Spezialist für innovative Lösungen für Mess- und Regeltechnik im Bereich Wasseranalyse
- 70 Jahre Erfahrung in der Herstellung von Instrumenten, Sensoren und Systemen “Made in Germany”

Oraylis Referenzprojekt IoT

- [x] Realtime Monitoring
- [x] Predictive Alarming
- [x] Predictive Maintenace

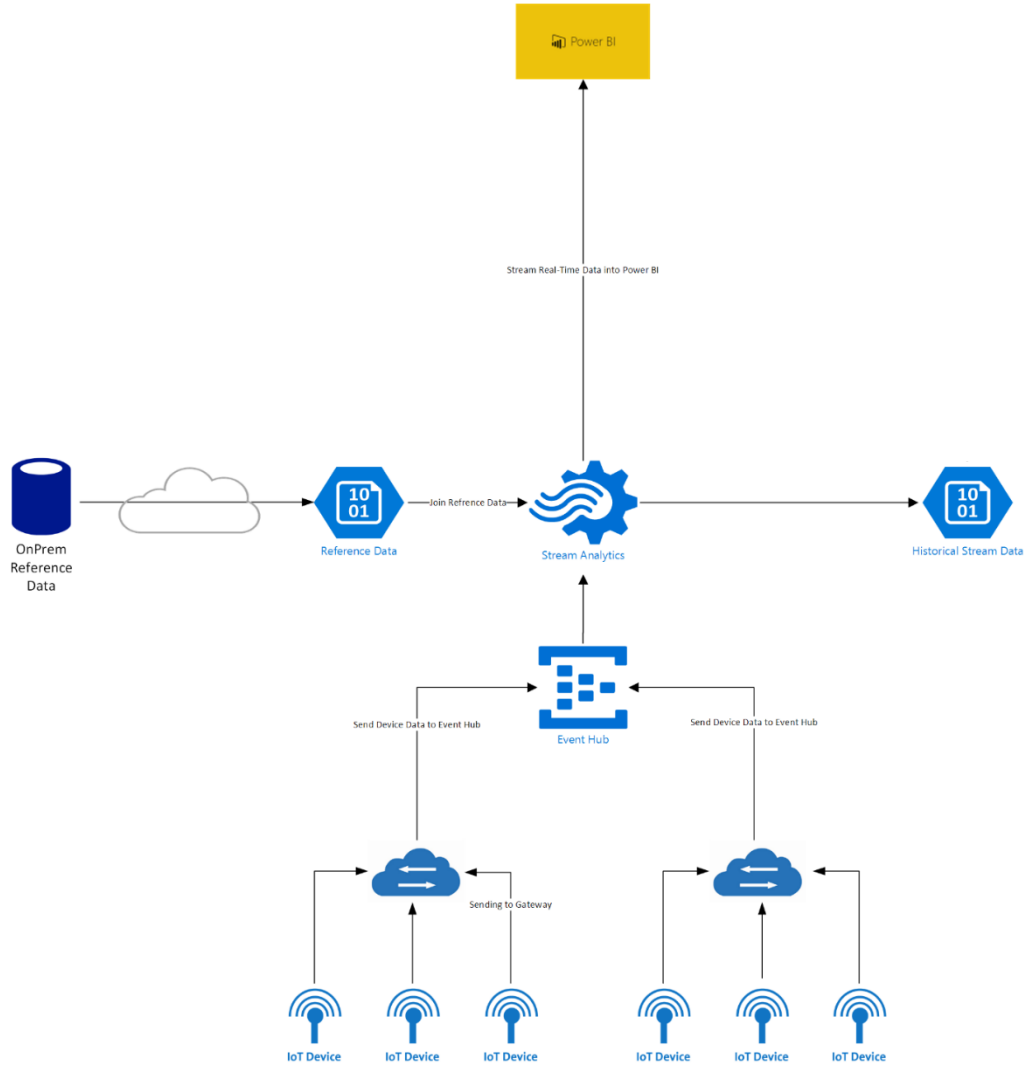
Instruments	Sensors	Systems	Services



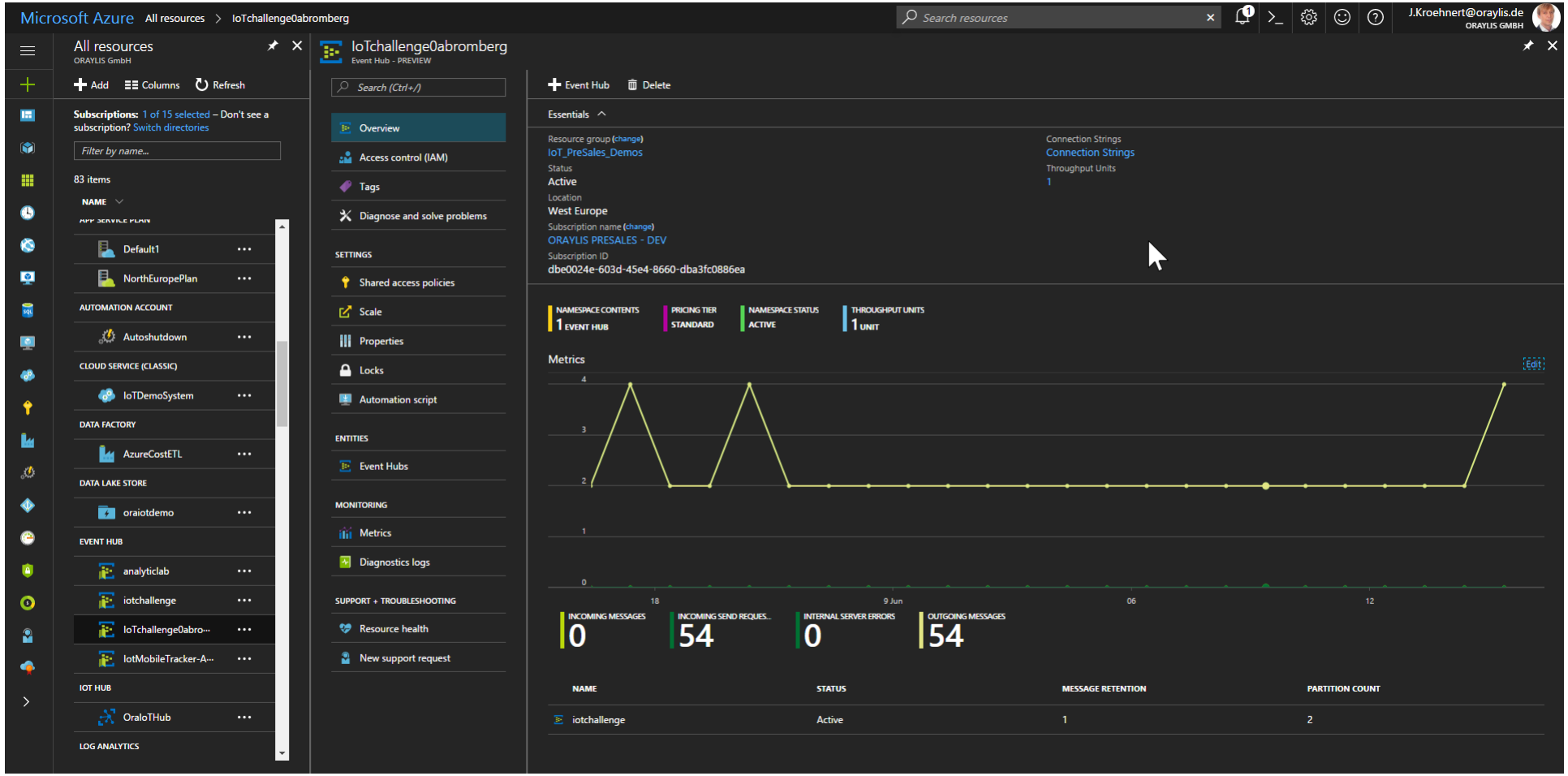


Architektur Step 1 Realtime

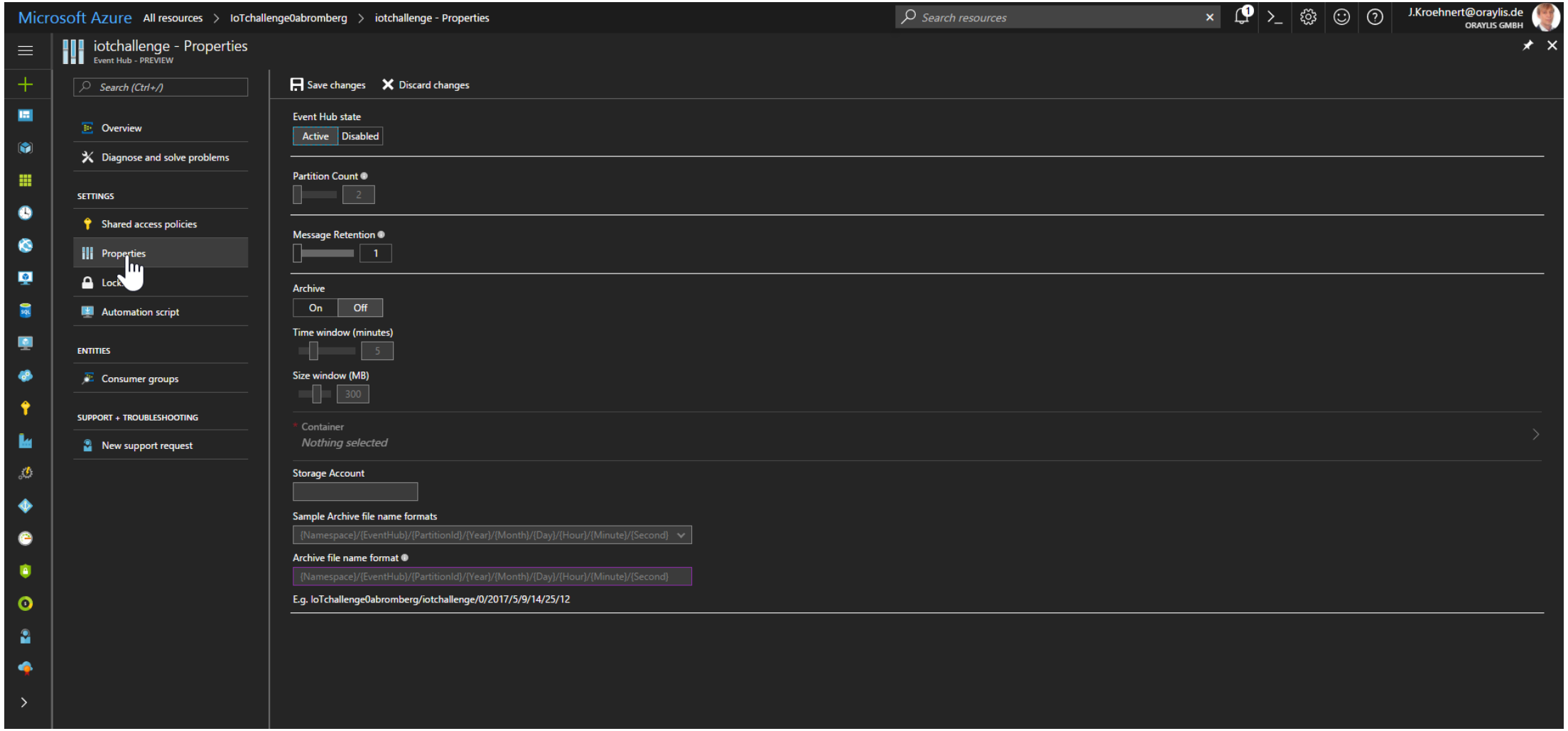
- Event Hub
  - Output Consumer Group
- Stream Analytics
  - Input Event Hub Consumer Group
  - Input Reference Data
  - „Complex Event Processing“ (SQL)
  - Output Power BI
  - Ouput Blob Storage
- Power BI
  - Real Time Dataset
- Data Factory
  - Gateway to OnPrem SQL Server
  - Orchestrate Reference Data Pull



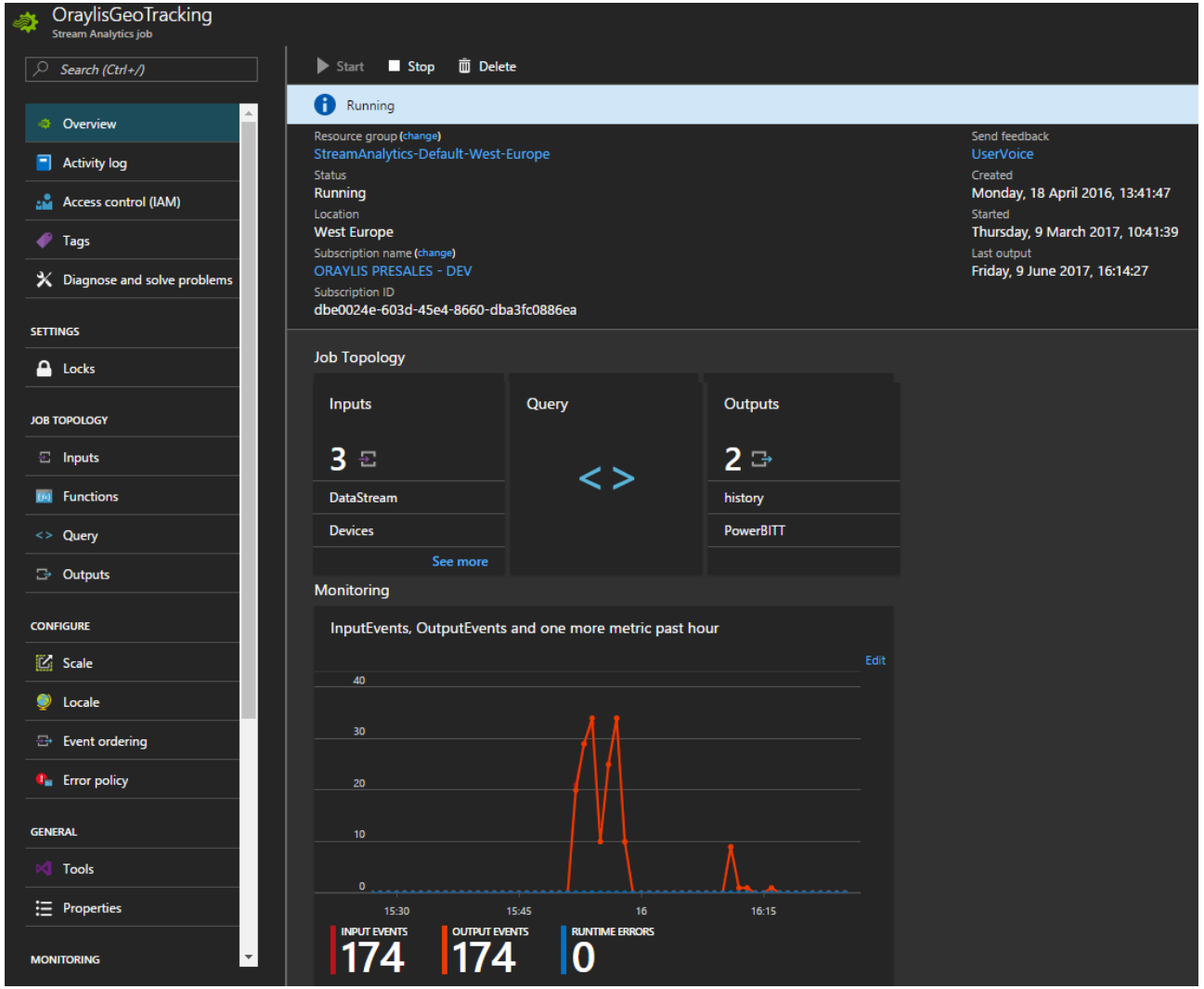
Azure Event Hub

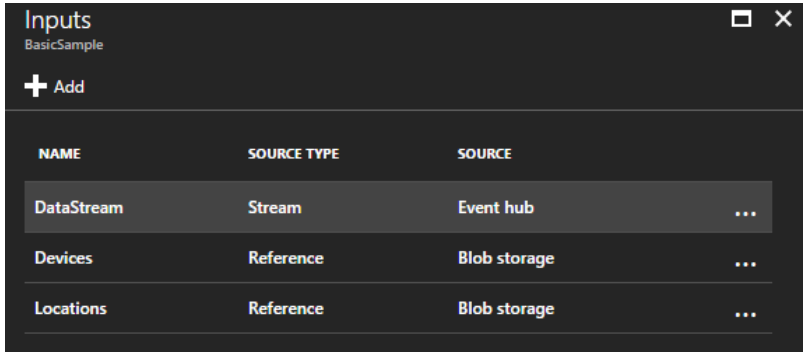


Azure Event Hub Konfiguration

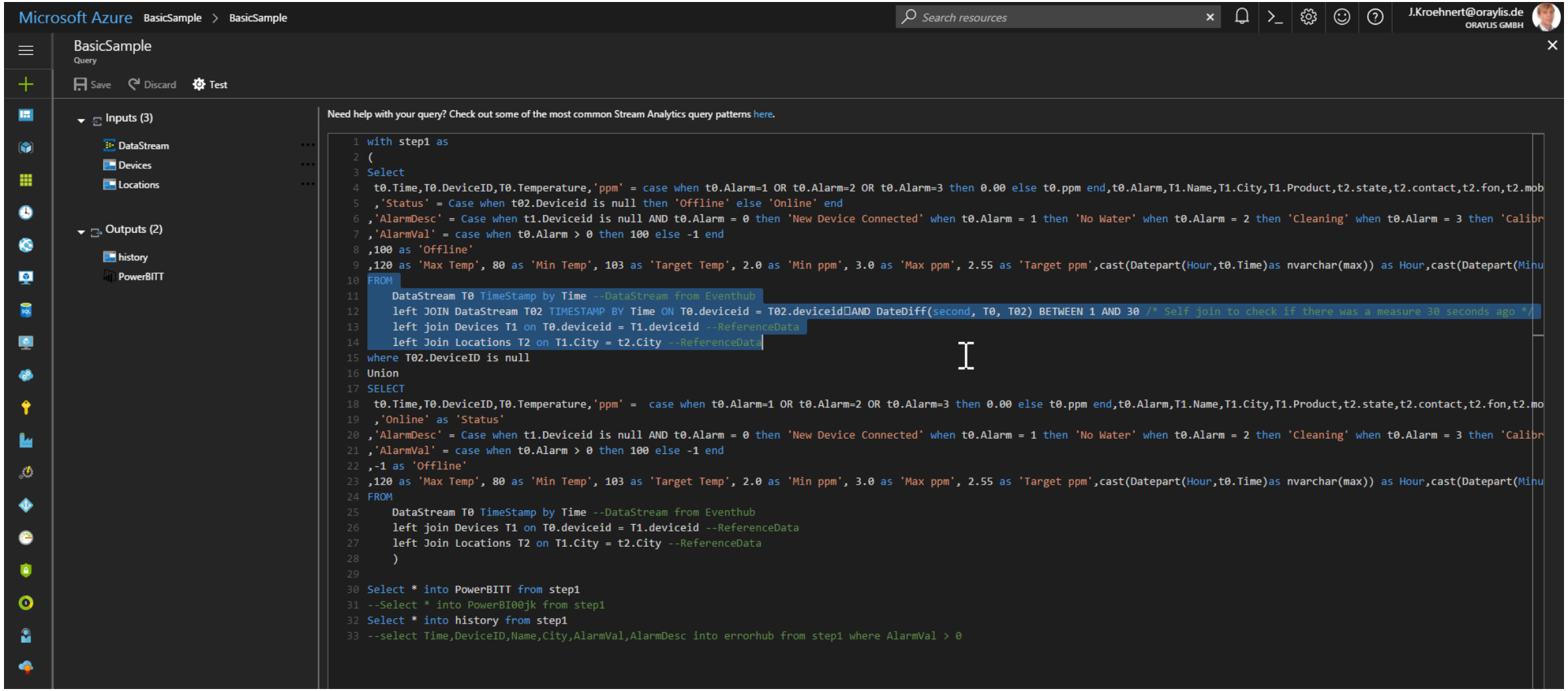


Stream Analytics Inputs mit Referenzdaten





Stream Analytics Abfrage mit SQL



Stream Analytics Best Practices

- Pivotisieren durch Tumbling Window

```
with pivotdata as (
Select System.Timestamp AS timecreated,T0.location,T0.organization,T0.displayname,
0.00 as AVG_Temperature,
0.00 as AVG_Humidity,
0.00 as AVG_Pressure,
0.00 as AVG_Altitude,
SUM(CASE T0.measurename WHEN 'Temperature' THEN T0.value ELSE 0.00 END)  'Temperature',
SUM(CASE T0.measurename WHEN 'Humidity' THEN T0.value ELSE 0.00 END)  'Humidity',
SUM(CASE T0.measurename WHEN 'Pressure' THEN T0.value ELSE 0.00 END) 'Pressure',
SUM(CASE T0.measurename WHEN 'Altitude' THEN T0.value ELSE 0.00 END) 'Altitude'
FROM EHoraweatherstation T0 TIMESTAMP BY timecreated
Group by T0.location,T0.organization,T0.displayname,TumblingWindow(second, 2)
),
avg_values as
(
Select System.Timestamp AS timecreated,location,organization,displayname,
```

Stream Analytics Best Practices

- Join des Stromes mit sich selbst: Änderungen verfolgen

Sie benötigen Hilfe bei Ihrer Abfrage? Einige der gängigsten Stream Analytics-Abfragemuster finden Sie hier.

```
1  with step1 as
2  (
3  Select
4   t0.Time,T0.DeviceID,T0.Temperature,'ppm' = case when t0.Alarm=1 OR t0.Alarm=2 OR t0.Alarm=3 then 0.00 else t0.ppm end,t0.A
5   ,'Status' = Case when t02.Deviceid is null then 'Offline' else 'Online' end
6  ,'AlarmDesc' = Case when t1.Deviceid is null AND t0.Alarm = 0 then 'New Device Connected' when t0.Alarm = 1 then 'No Water'
7  ,'AlarmVal' = case when t0.Alarm > 0 then 100 else -1 end
8  ,100 as 'Offline'
9  ,120 as 'Max Temp', 80 as 'Min Temp', 103 as 'Target Temp', 2.0 as 'Min ppm', 3.0 as 'Max ppm', 2.55 as 'Target ppm',cast(D
10 FROM
11     DataStream T0 TimeStamp by Time --DataStream from Eventhub
12     left JOIN DataStream T02 TIMESTAMP BY Time ON T0.deviceid = T02.deviceidAND DateDiff(second, T0, T02) BETWEEN 1 AND 30
13     left join Devices T1 on T0.deviceid = T1.deviceid --ReferenceData
14     left Join Locations T2 on T1.City = t2.City --ReferenceData
15 where T02.DeviceID is null
16 Union
17 SELECT
```

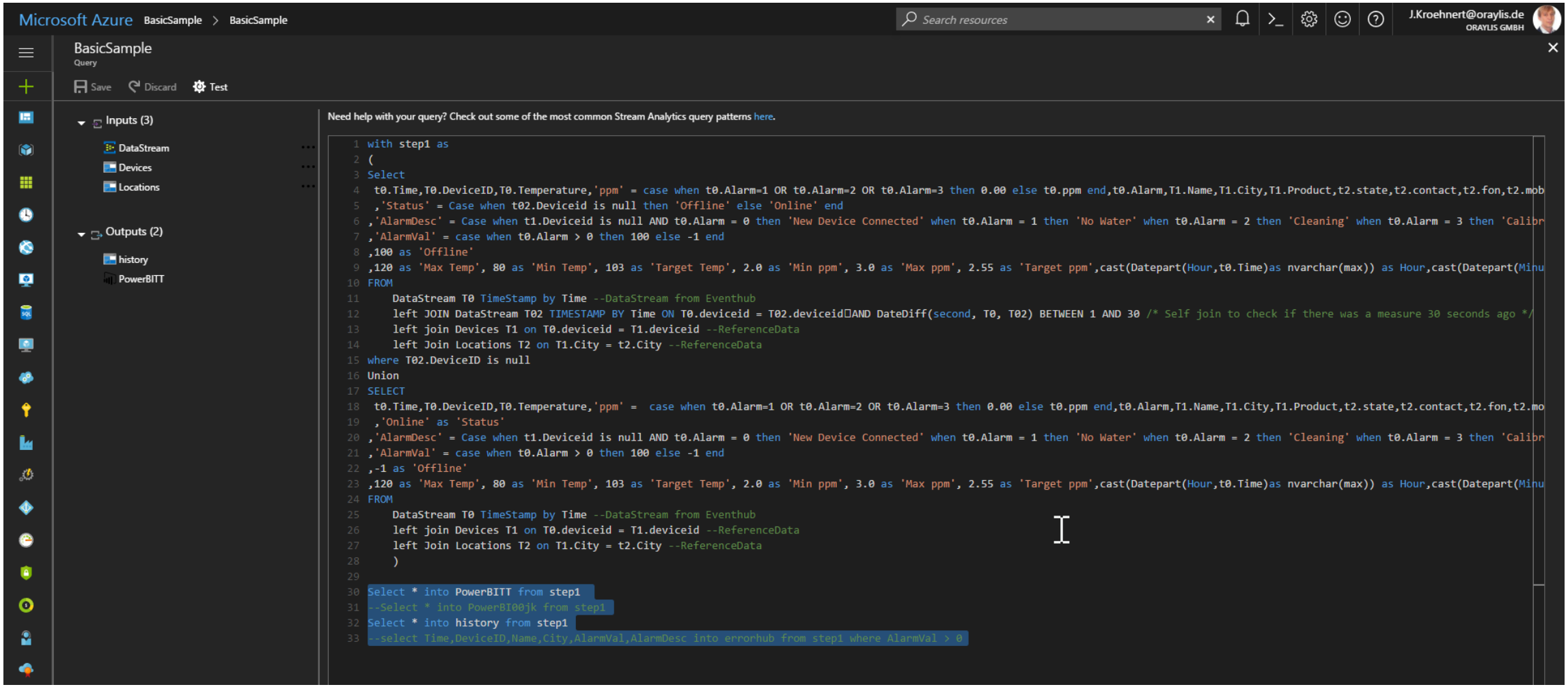
Stream Analytics Best Practices

- Last-Funktion: z.B. Werte fortschreiben (auch bei Abbruch des Stroms)

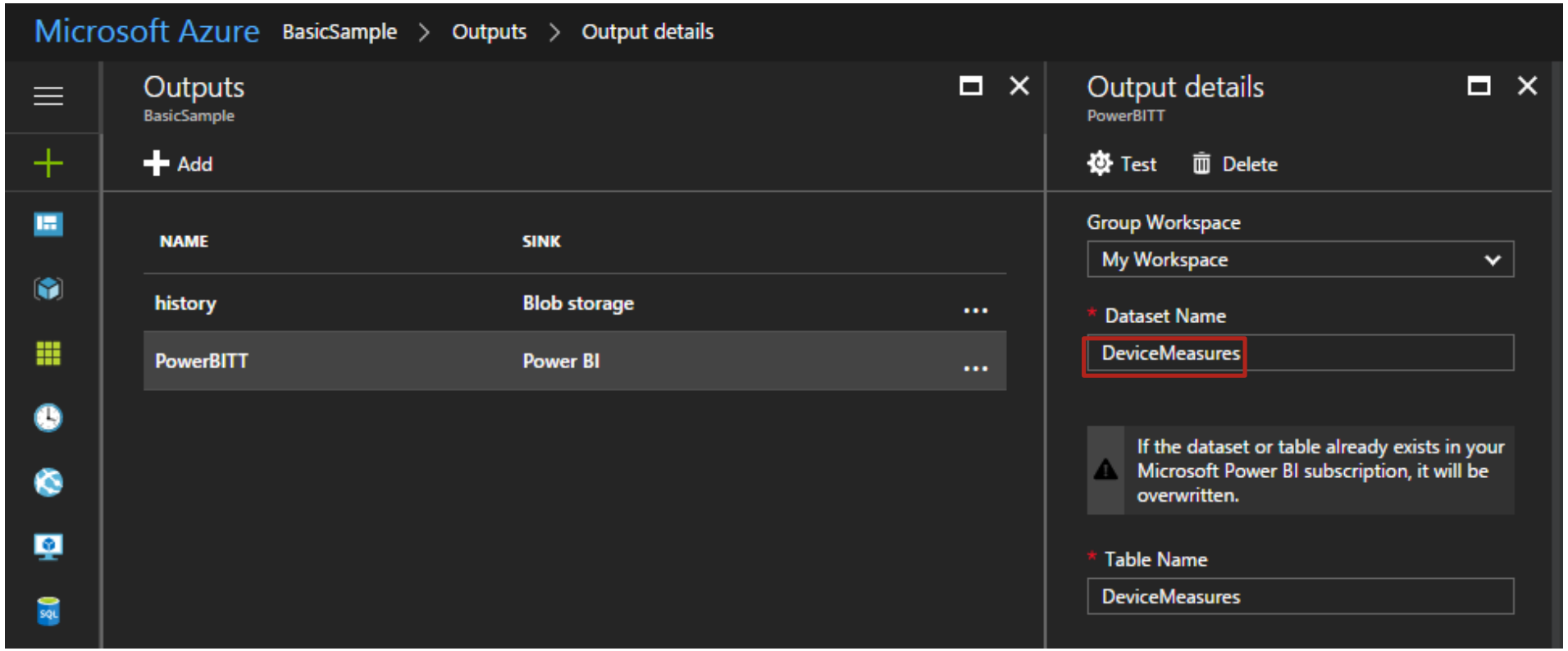
Sie benötigen Hilfe bei Ihrer Abfrage? Einige der gängigsten Stream Analytics-Abfragemuster finden Sie hier.

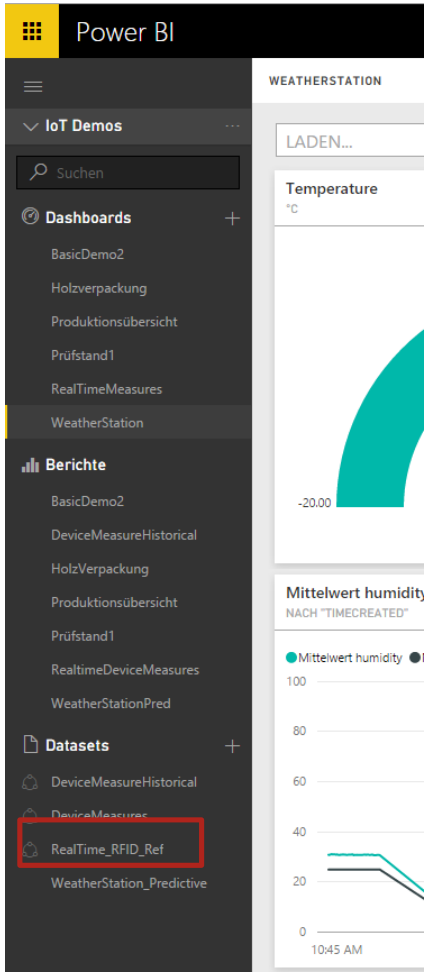
```
1 Select Timestamp ,serial,
2 last(value) OVER (PARTITION BY serial LIMIT DURATION(hour, 24) WHEN description = 'temp_vts_r_hk2') as'temp_vts_r_hk2',
3 last(value) OVER (PARTITION BY serial LIMIT DURATION(hour, 24) WHEN description = 'system_konfiguration_drbhp') as 'system_konfiguration_drbhp'
4 From Eventhub
5
```

Stream Analytics Abfragen für Outputs

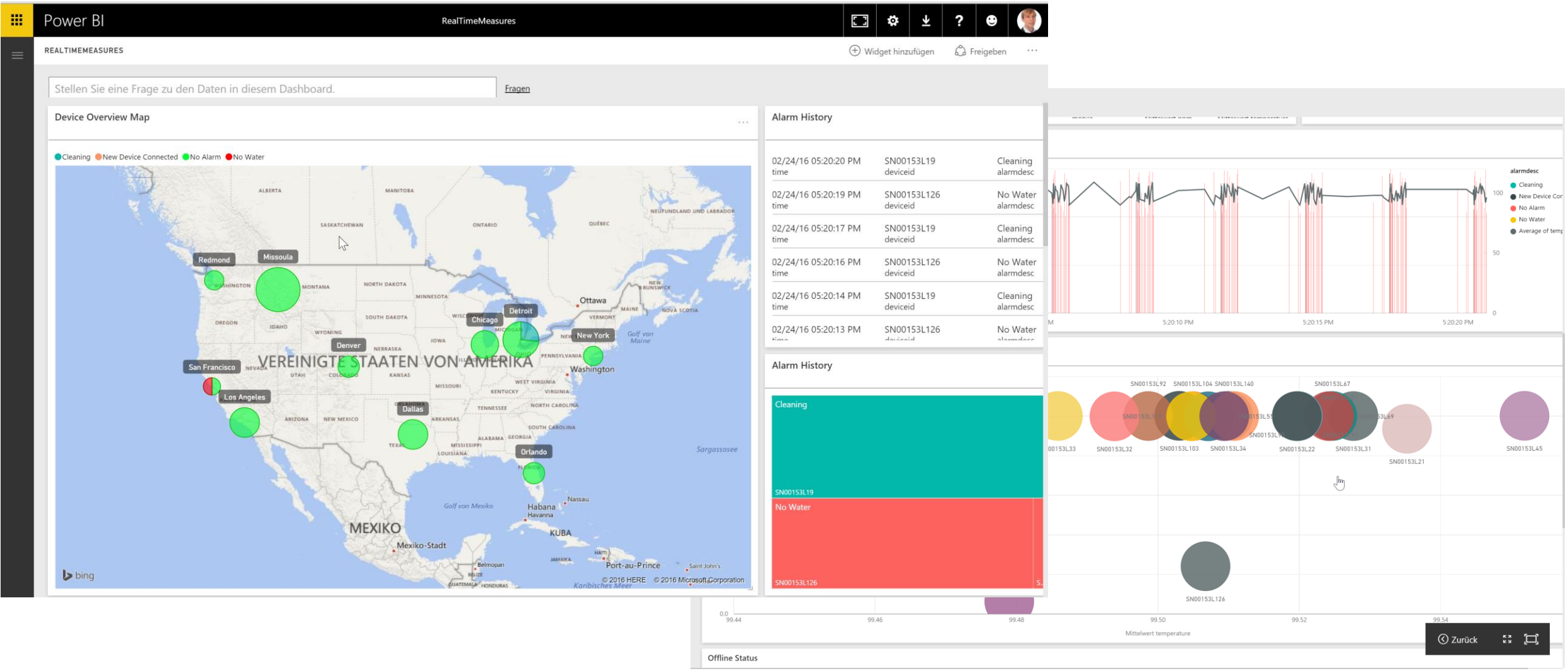


Stream Analytics Output für Power BI





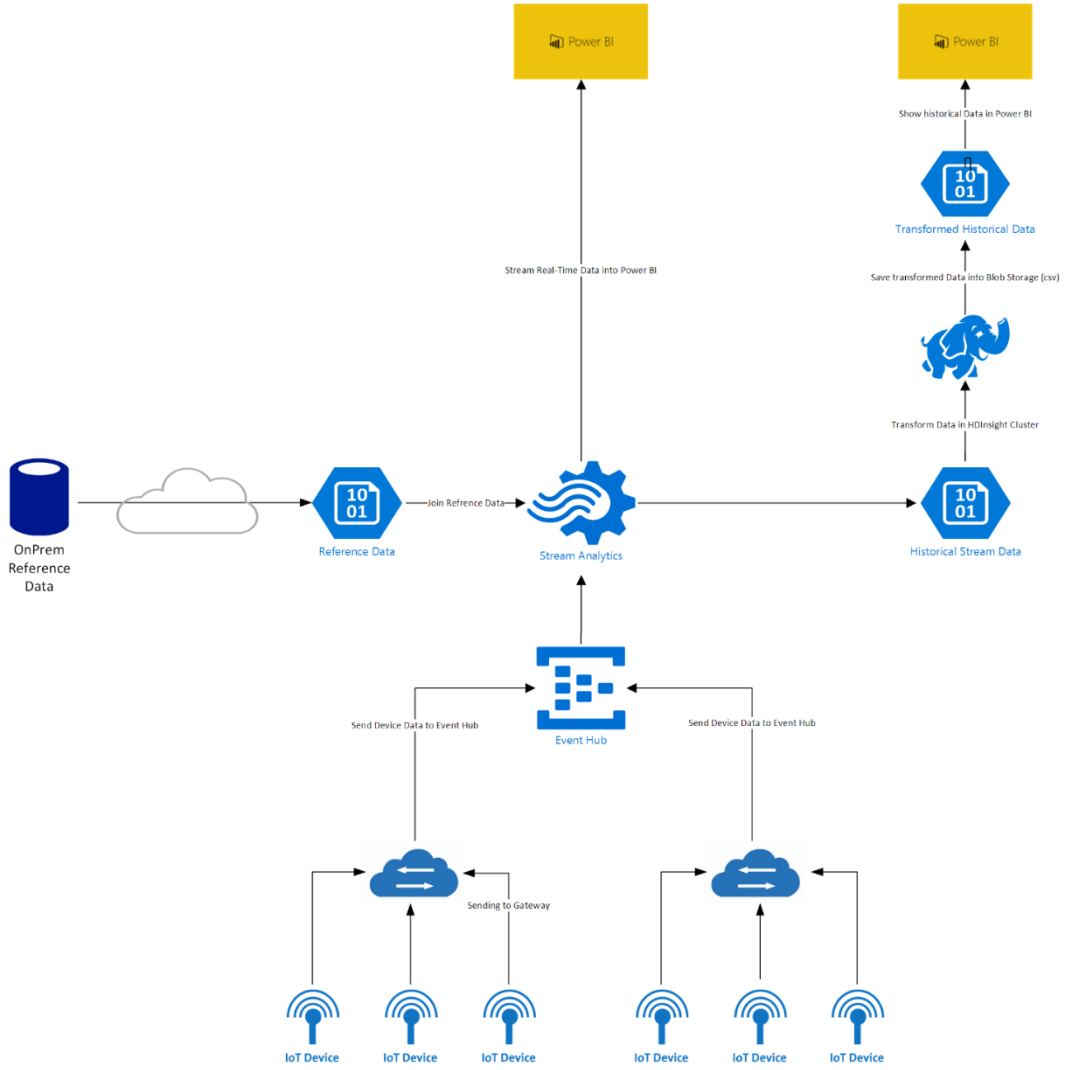
Visualisierung mit Power BI



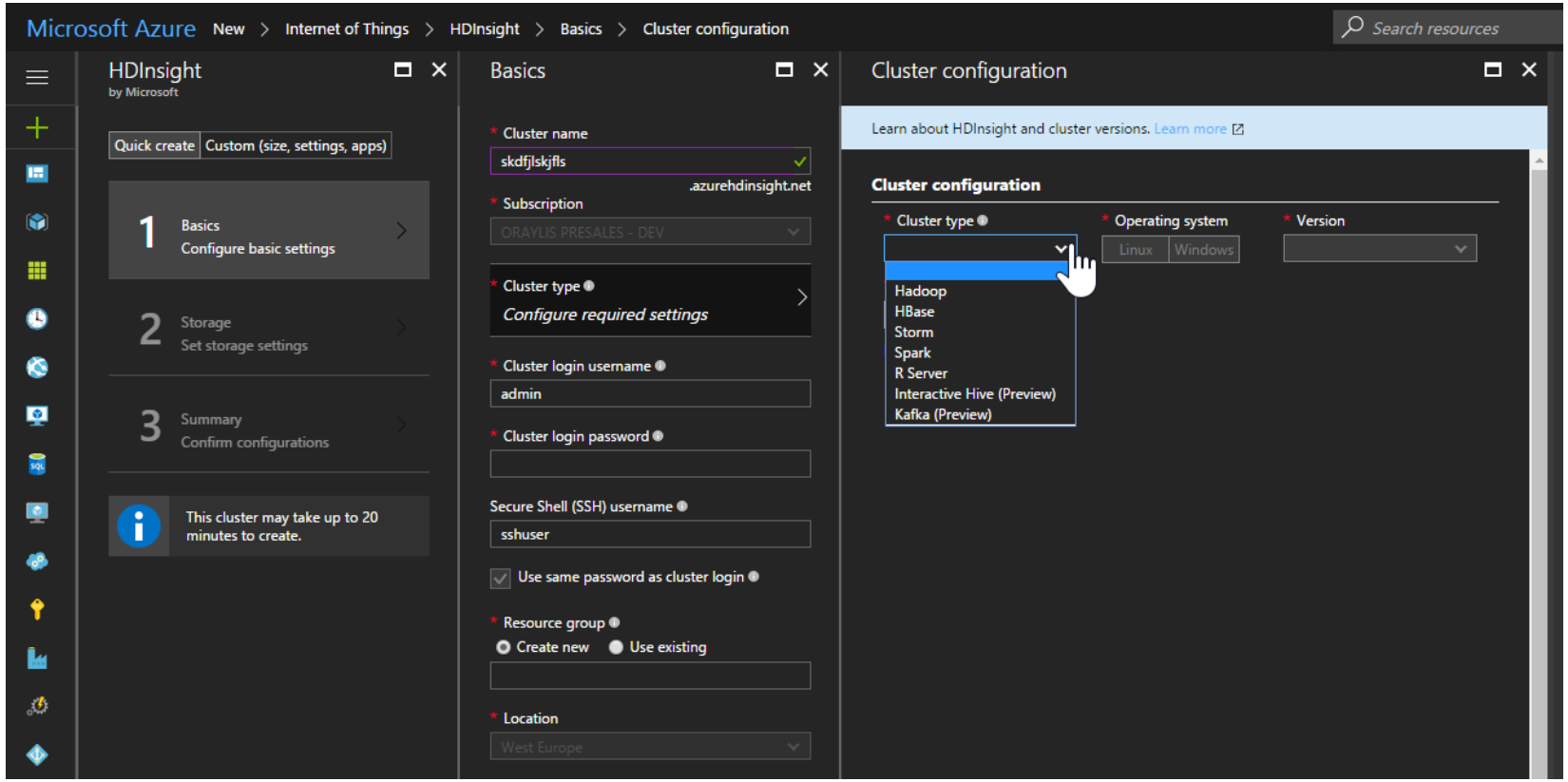
Lambda Schritt 2: Batch – Cold Path

Architektur Step 2 Batch

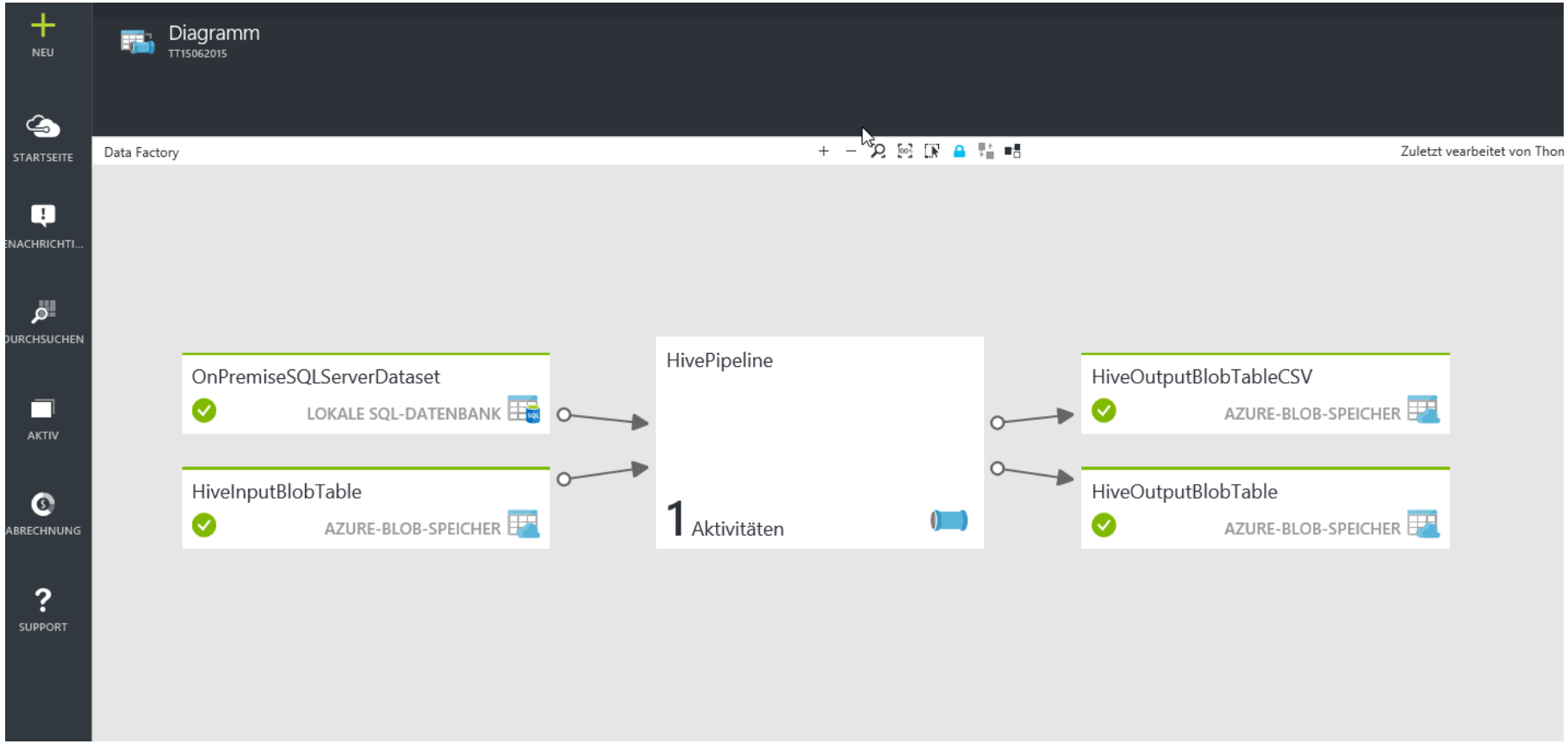
- HDInsight
  - Nightly Batch
  - Input Blob Storage (JSON)
  - Output Blob Storage (csv)
- Power BI
  - Batch Dataset over Power Query Blob Storage
- Data Factory
  - Orchestrate nightly HDInsight OnDemand Hive Execution



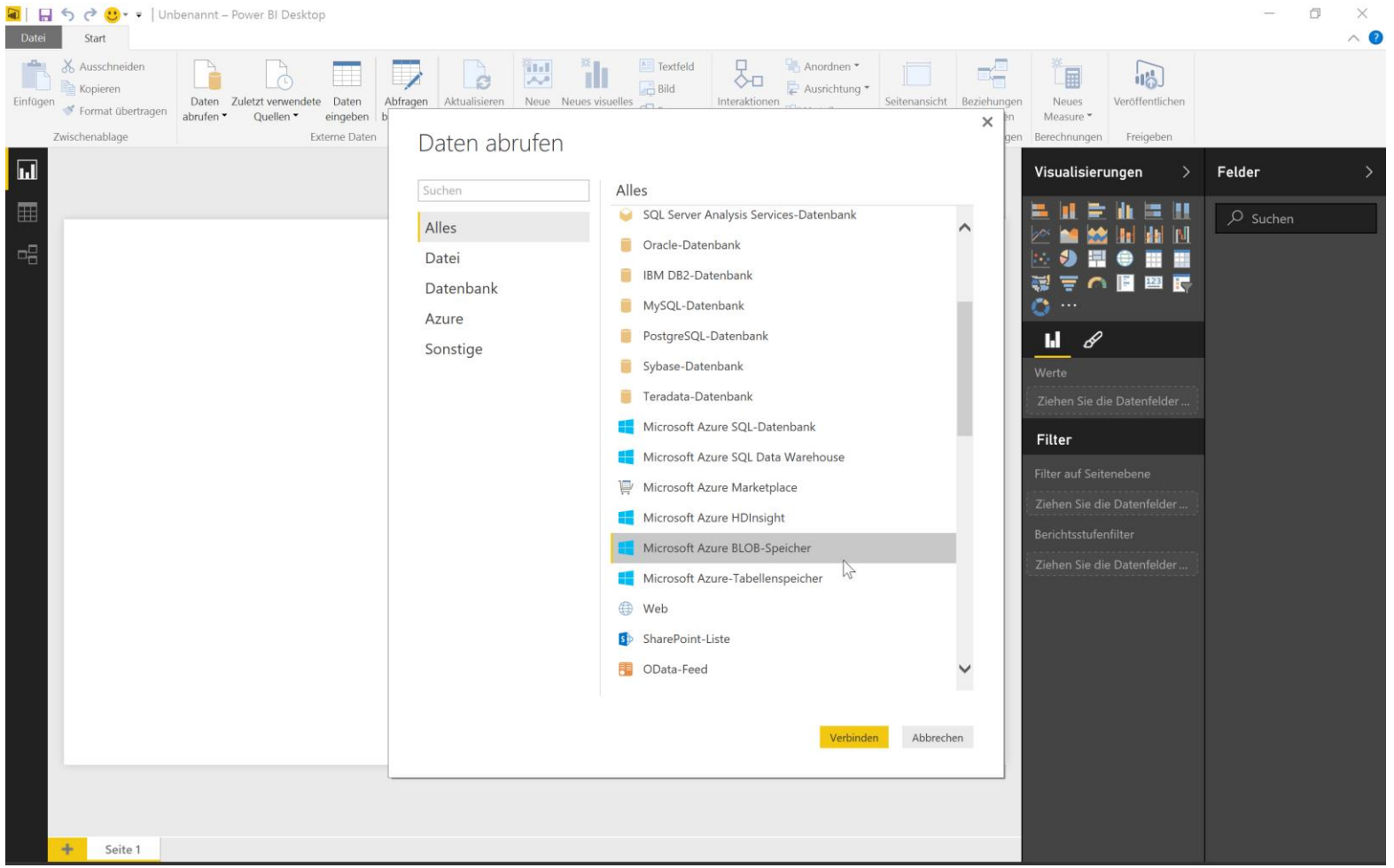
HDInsight (Microsoft Brand of Hortonworks Data Plattform) – Hadoop as a Service



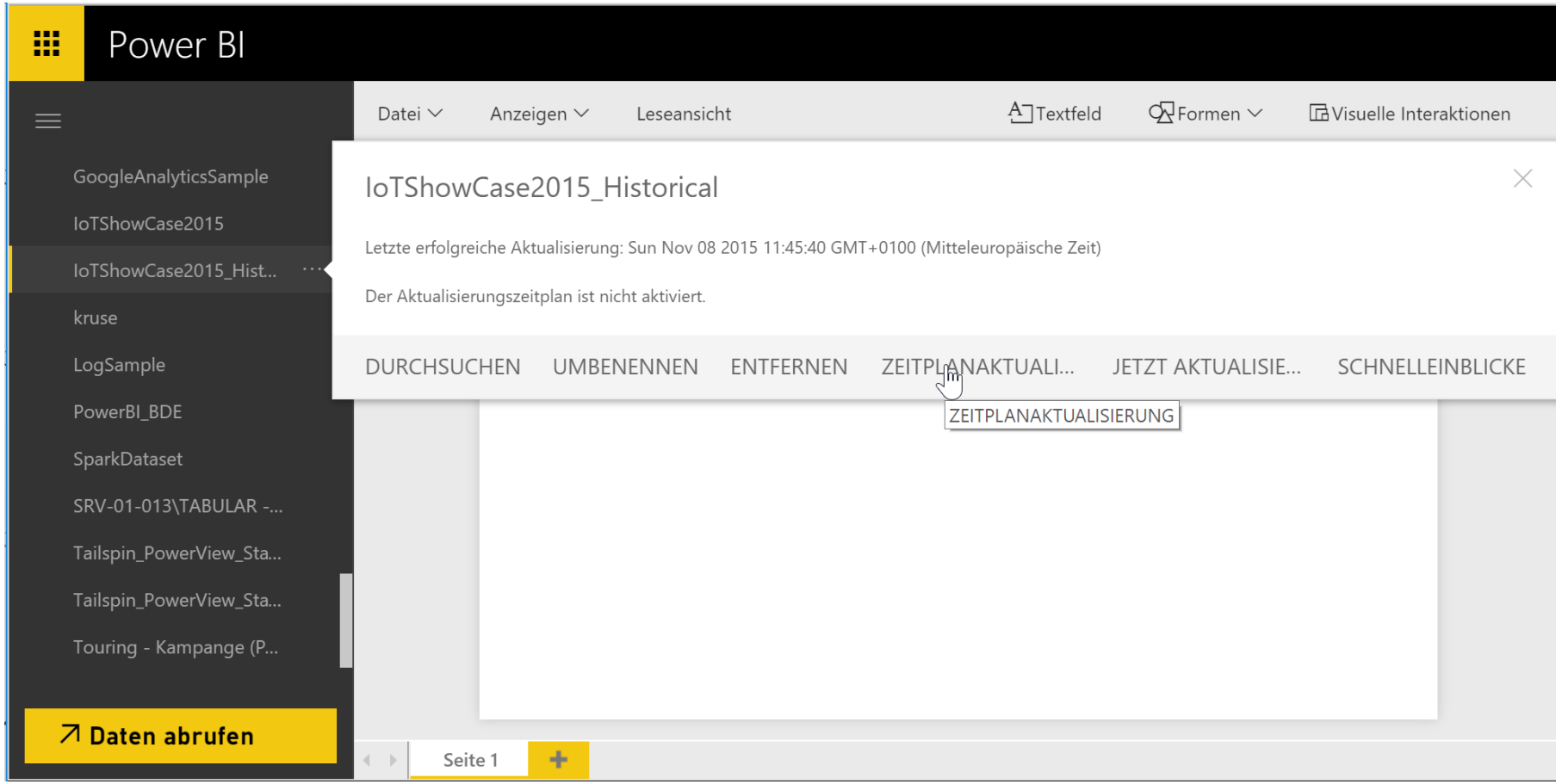
HDInsight on Demand – Azure Data Factory



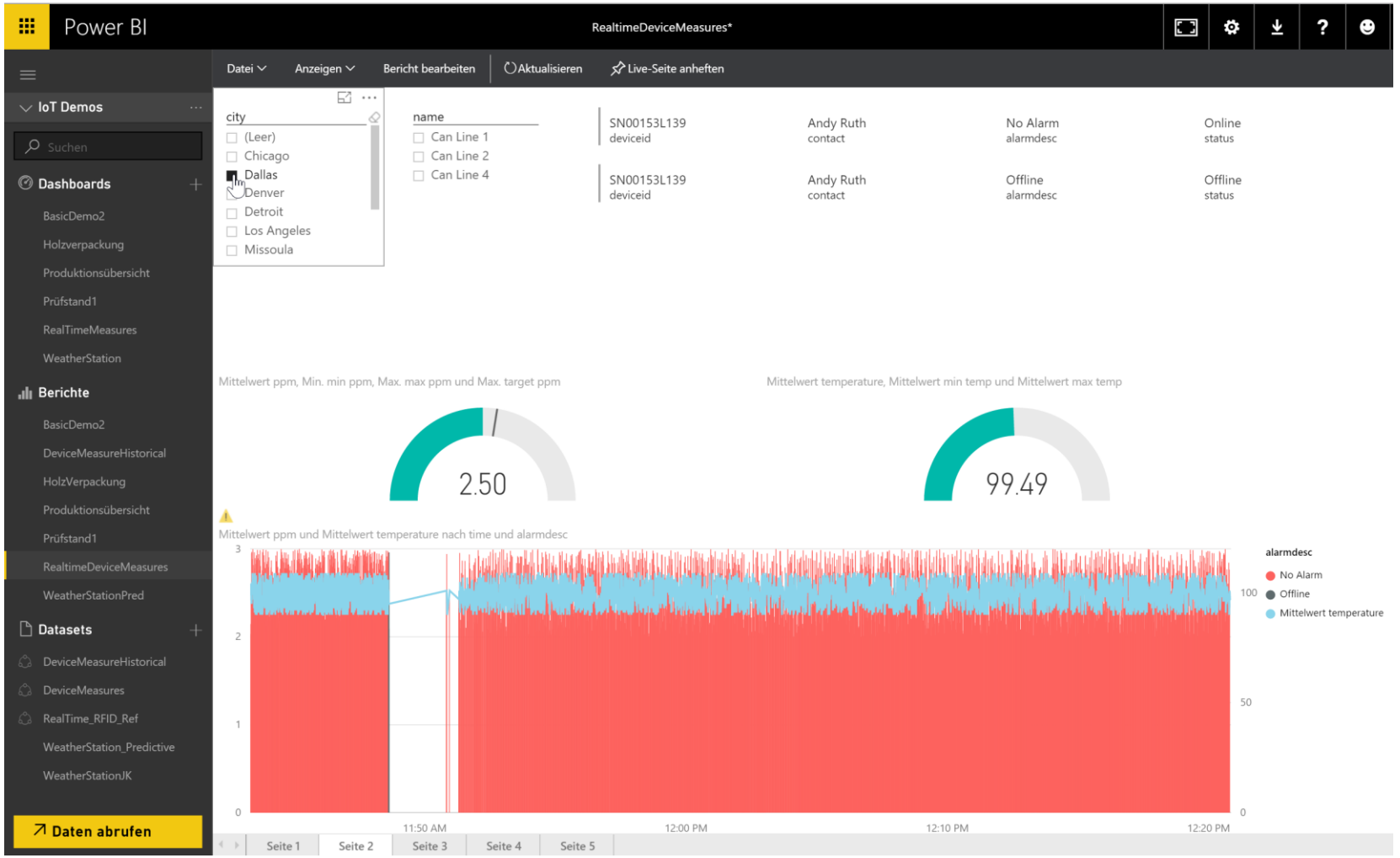
Batch Load to Serving Layer (Power BI)



Batch Load to Serving Layer (Power BI)

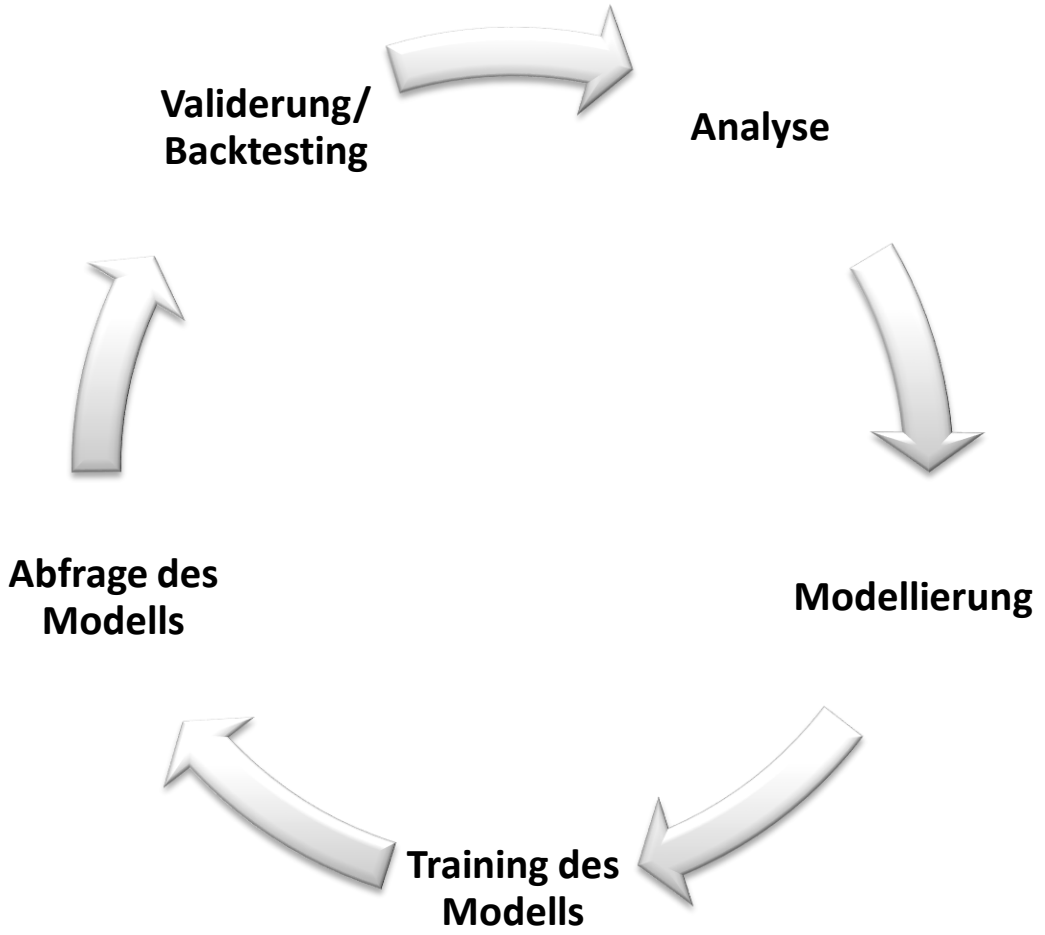


Historie und abgeleitete Kennzahlen in Power BI



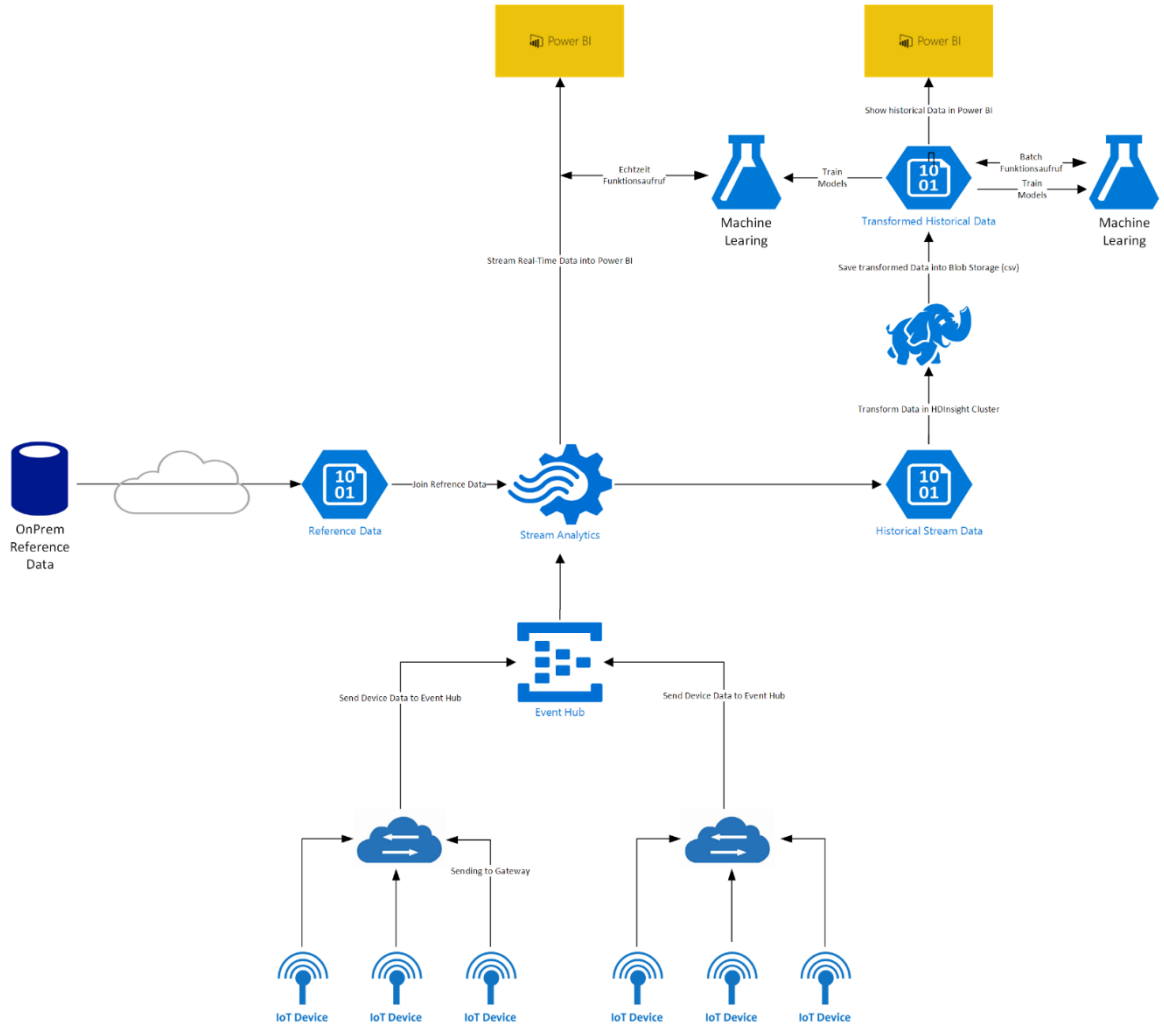
Lambda Schritt 3: Predictive / Artificial Intelligence (AI)

Data Mining Prozess

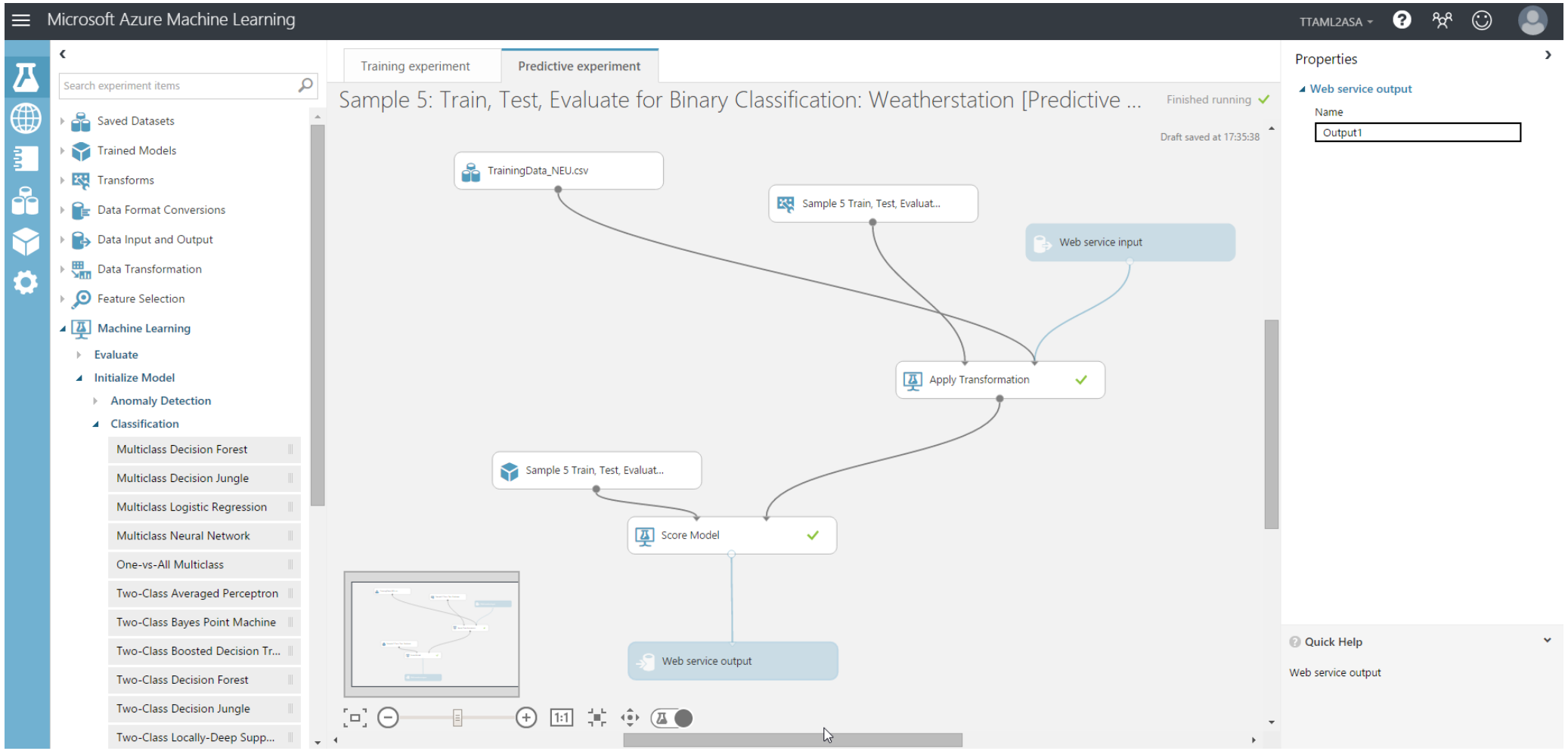


Architektur Step 3 Predictive

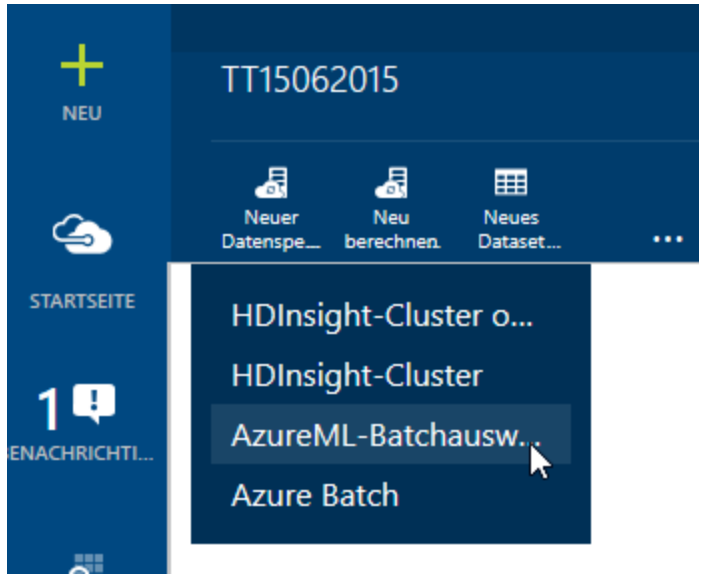
- HDInsight
  - Nightly Batch
  - Input Blob Storage (JSON)
  - Output Blob Storage TrainingsData
- Azure ML
  - Train Model Predictive Alarming
  - Train Model Predictive Maintenance
- Stream Analytics
  - FunctionCall Real-Time Model Predictive Alarming
- Data Factory
  - Batch Get Reference Data from OnPrem SQL DB
  - Batch FunctionCall Predictive Maintenance

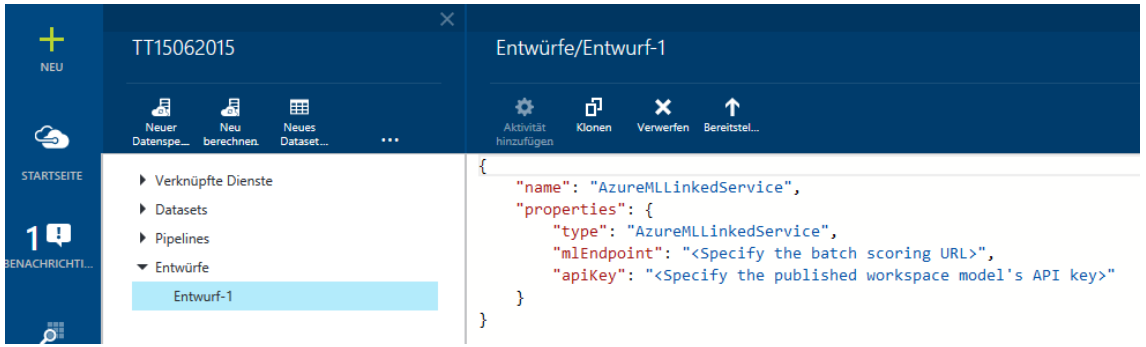


Azure ML (Machine Learning)

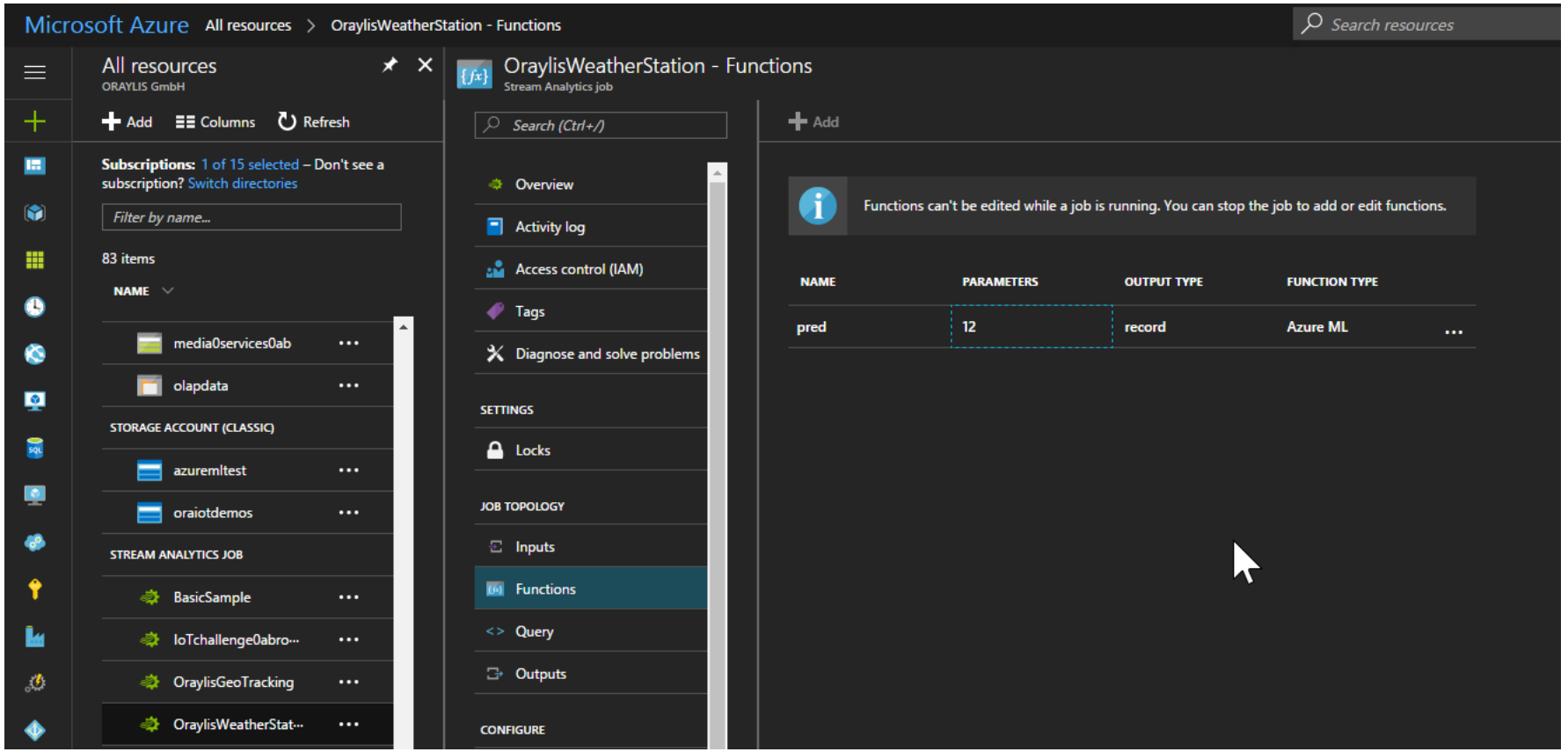


ML Batch Funktionsaufruf in Data Factory





ML Funktionsaufruf in Stream Analytics



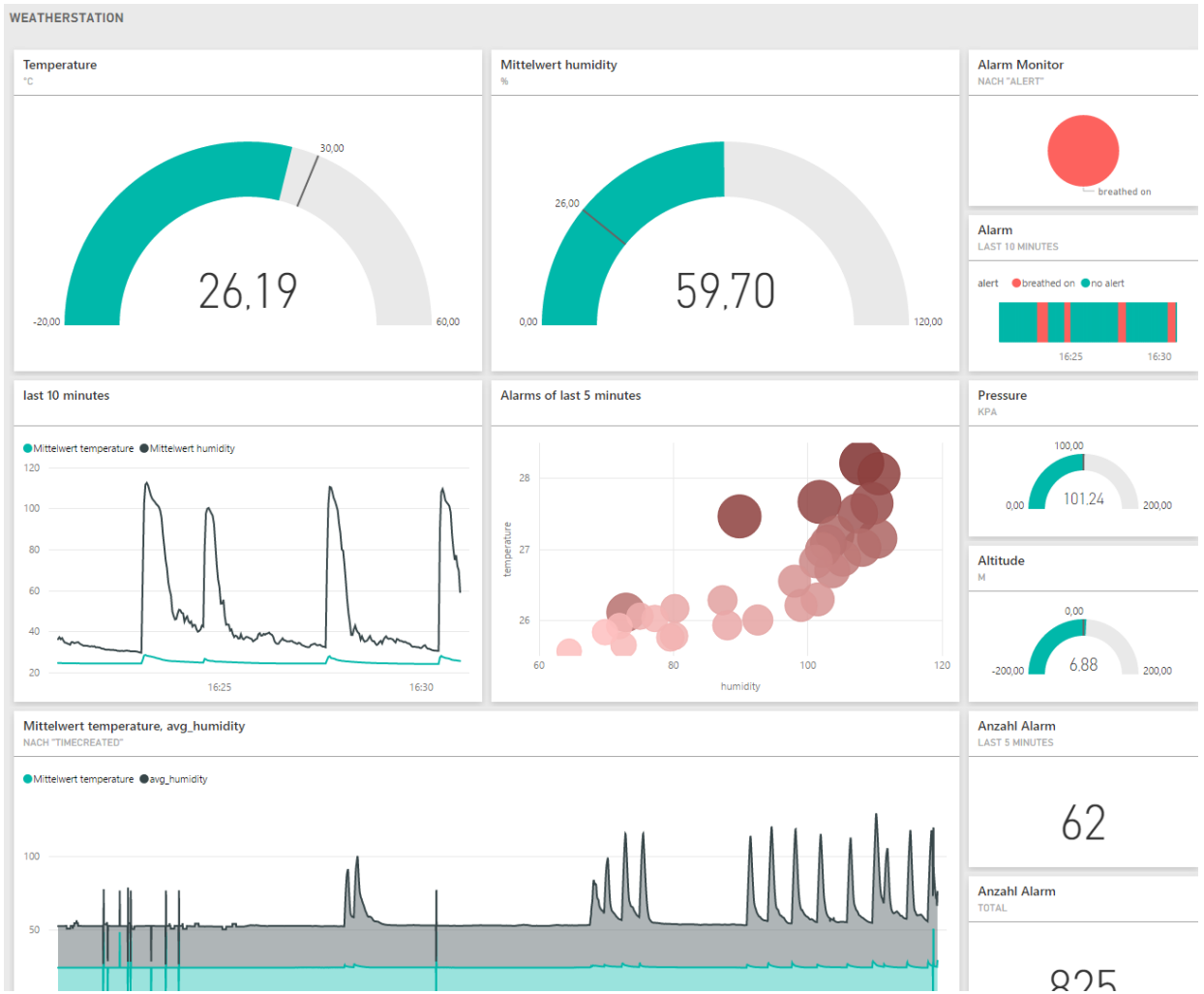
Funktionssignatur

```
pred(temperature FLOAT, avg_temperature FLOAT, ratio_temperature FLOAT, humidity FLOAT, avg_humidity FLOAT, ratio_humidity FLOAT, pressure FLOAT, avg_pressure FLOAT, ratio_pressure FLOAT, altitude FLOAT, avg_altitude FLOAT, ratio_altitude FLOAT) RETURNS RECORD
```

ML Funktionsaufruf Best Practice

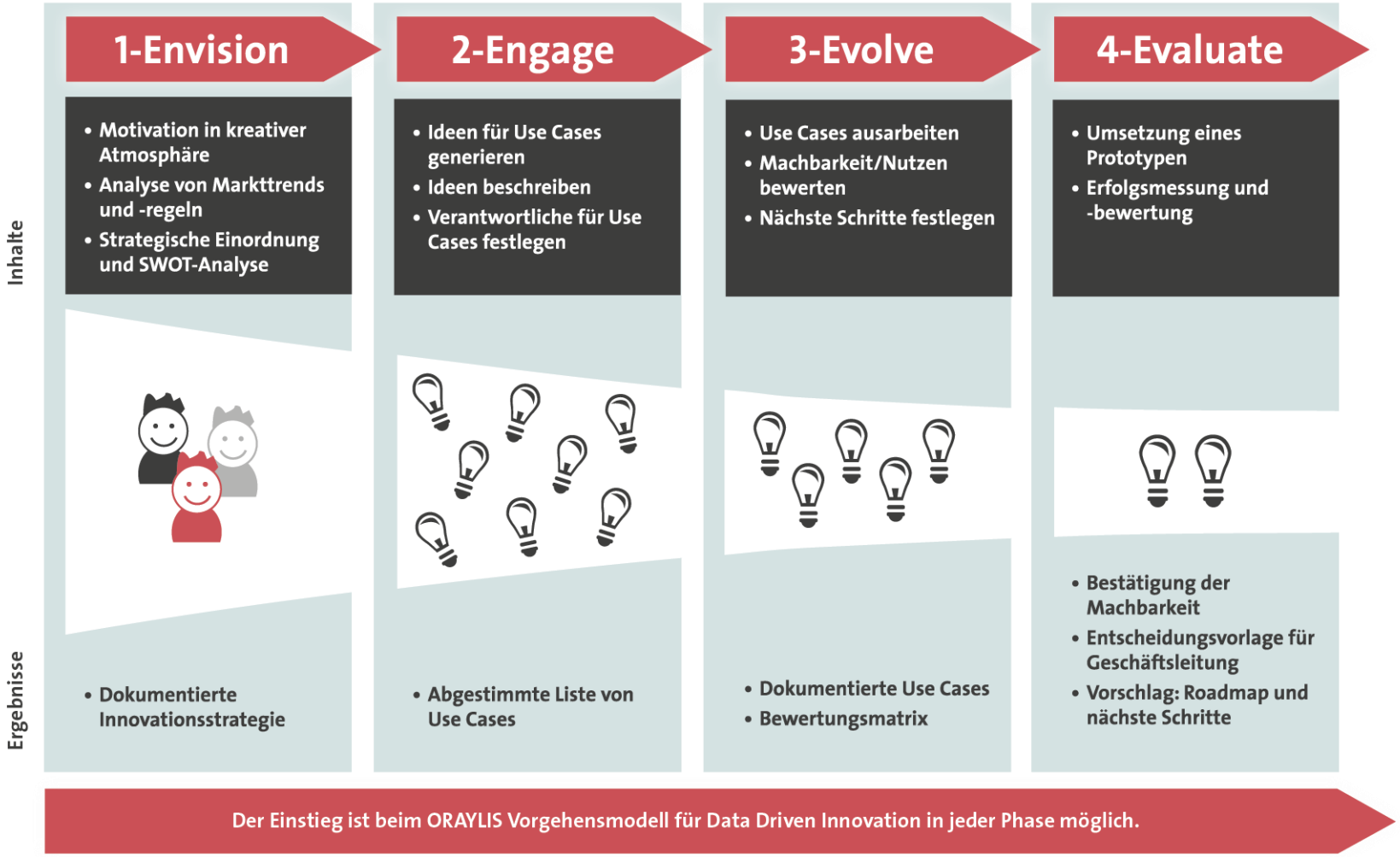
```
53 result_prediction as
54 (
55 Select System.Timestamp AS timecreated,location,organization,displayname,
56 temperature,avg_temperature,ratio_temperature,humidity,avg_humidity,ratio_humidity,pressure,avg_pressure,ratio_pressure,altitude,avg_altitude,ratio_altitude,
57 pred(temperature,avg_temperature,ratio_temperature,humidity,avg_humidity,ratio_humidity,pressure,avg_pressure,ratio_pressure,altitude,avg_altitude,ratio_altitude) as r
58 from result
59 )

63 Select timecreated,location,organization,displayname,temperature,avg_temperature,ratio_temperature,humidity,avg_humidity,ratio_humidity,pressure,avg_pressure,ratio_pressure,altitude,avg_altitude,
64 r.[Scored Labels],r.[Scored Probabilities],'Alert' = case r.[Scored Labels] when 'H' then 'breathed on' else 'no alert' end  into PowerBITTPred
65 from result_prediction T0
```

Demo Predictive Alert

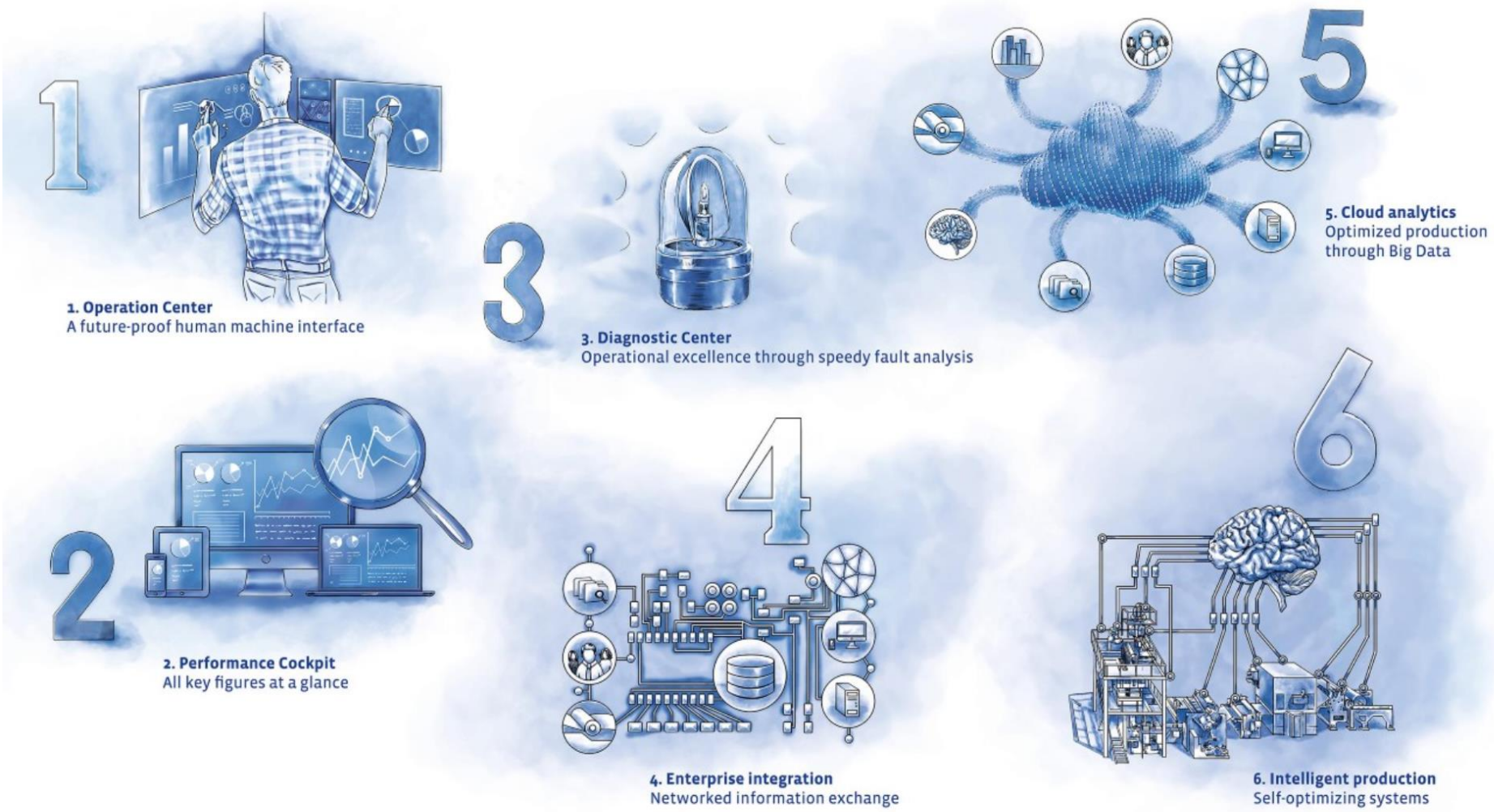


Kunden Situation: Wie innovieren?

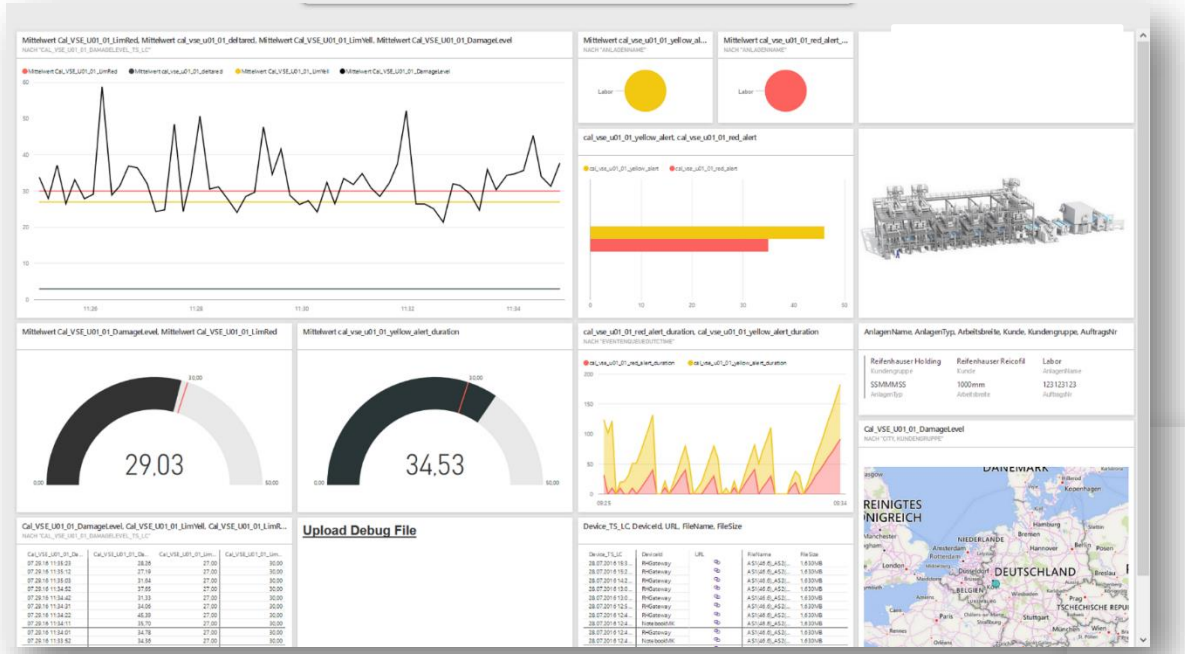
Data Driven Innovation is a managebel process

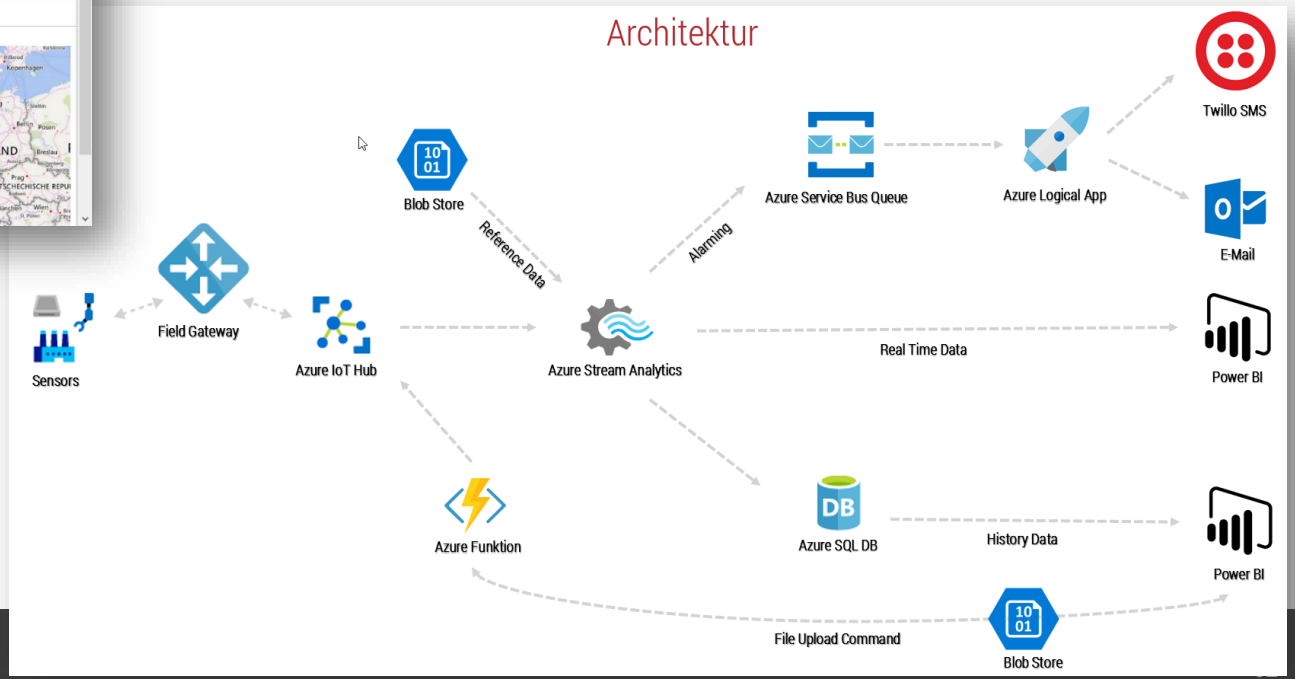


Kunde Anlagenbauer: Strategie Papier (Think Big)



1. InnovationLab Ergebnis für Kunde Anlagenbauer: (Start Small)





KRONES

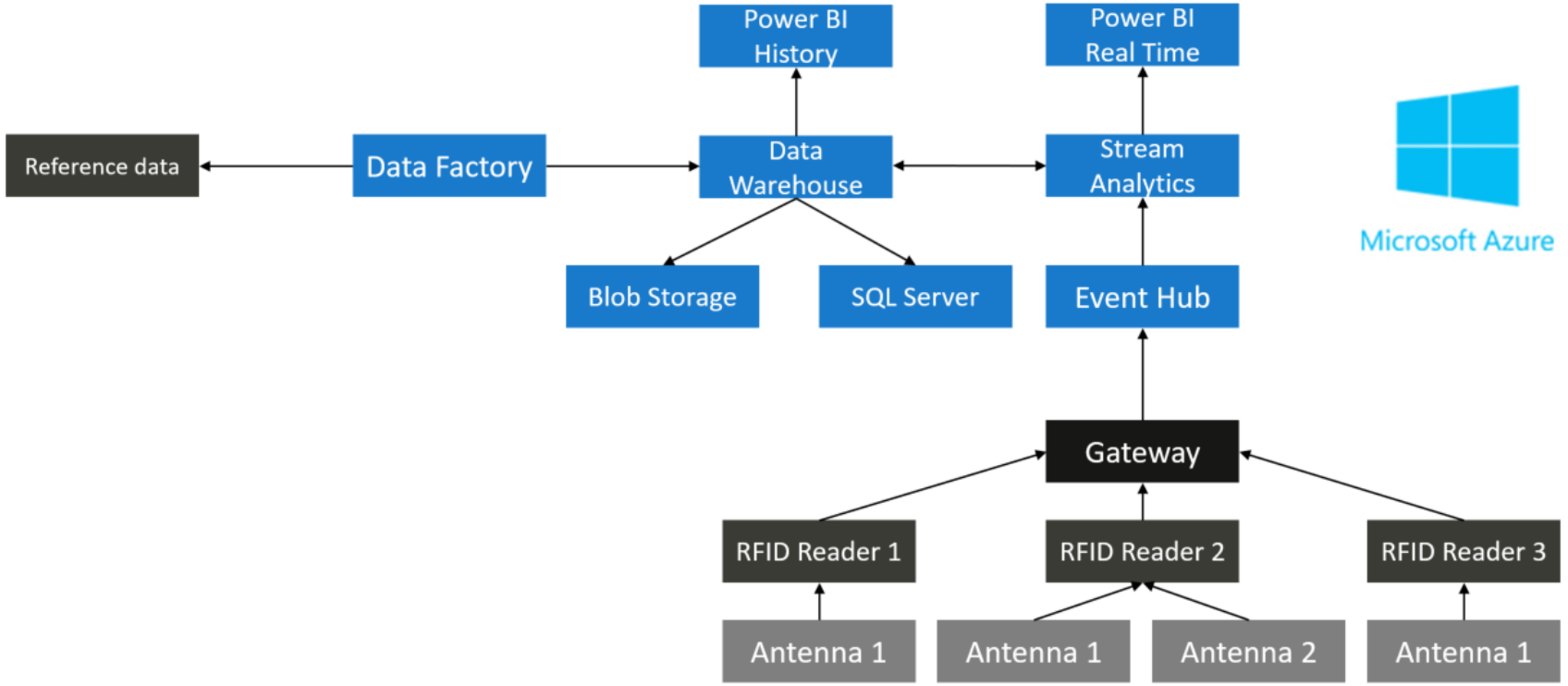
- DWH and Microsoft BI
- **Consolidation of DWH and Big Data as one team since summer 2016**
- Big Data Use Cases
  - Material used list in SAP with Hadoop
  - Hybrid Hadoop: OnPrem Hortonworks & Azure Managed Service HDInsight
  - Sensor data analytics
  - Predictive Alarming / Maintenance -> IoT scenario
  - AtScale (BI) on Hadoop

GRUNDFOS®

- Big IoT Cases in Danmark
- Use Case „Optimizing the production line of a customerindividual product“
  - Control & monitoring manufacturing line
  - Realtime Dashboard for workers
  - Proactive status information for customer
- RFID technology

Grundfos optimizes Assembly of Pumps with RFID and Azure IoT Suite

Digitalization



be think innovate

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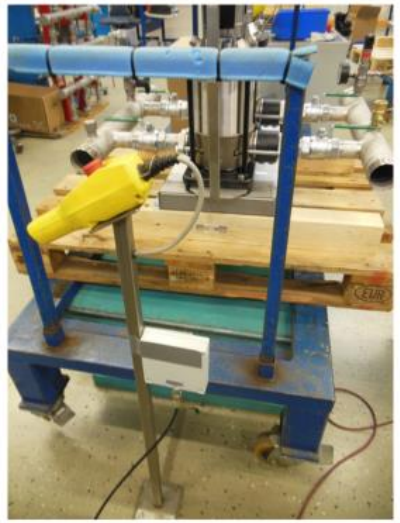
Grundfos optimizes Assembly of Pumps with RFID and Azure IoT Suite

Starting small, winning big

Innovation Lab
- Test idea in real environment



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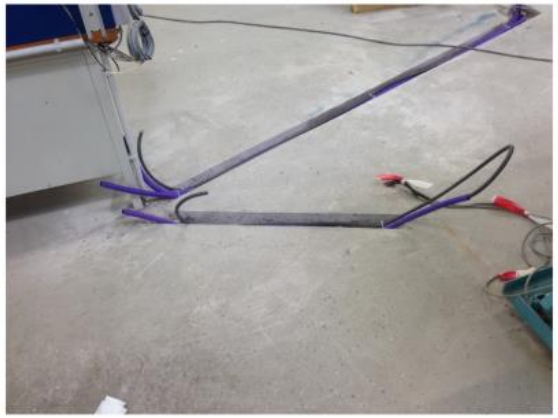
Grundfos optimizes Assembly of Pumps with RFID and Azure IoT Suite

Starting small, winning big

Installation Phase
- Digitalize Workplaces





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Grundfos optimizes Assembly of Pumps with RFID and Azure IoT Suite

Starting small, winning big

- Process




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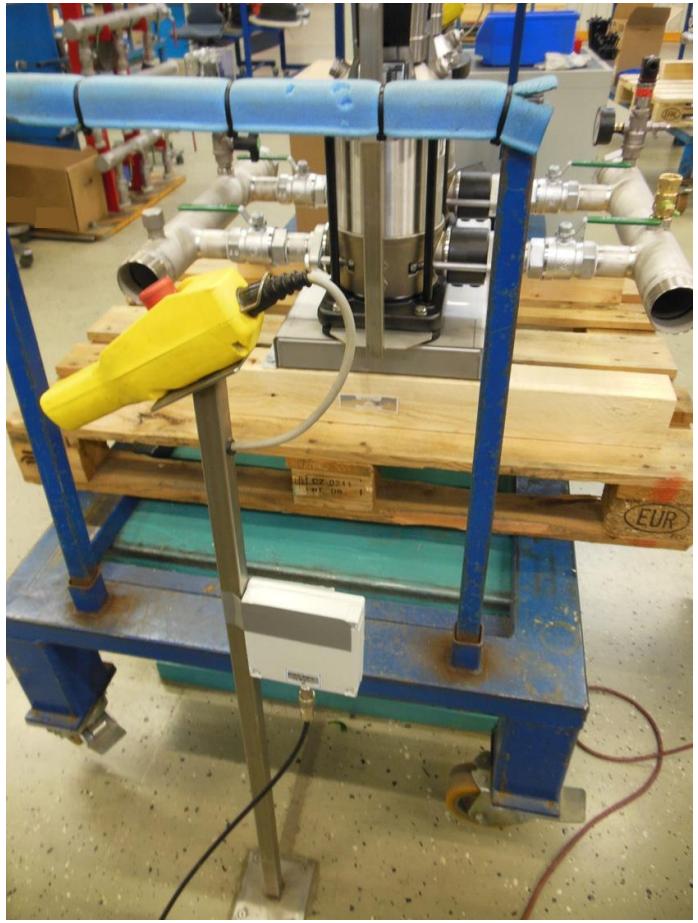
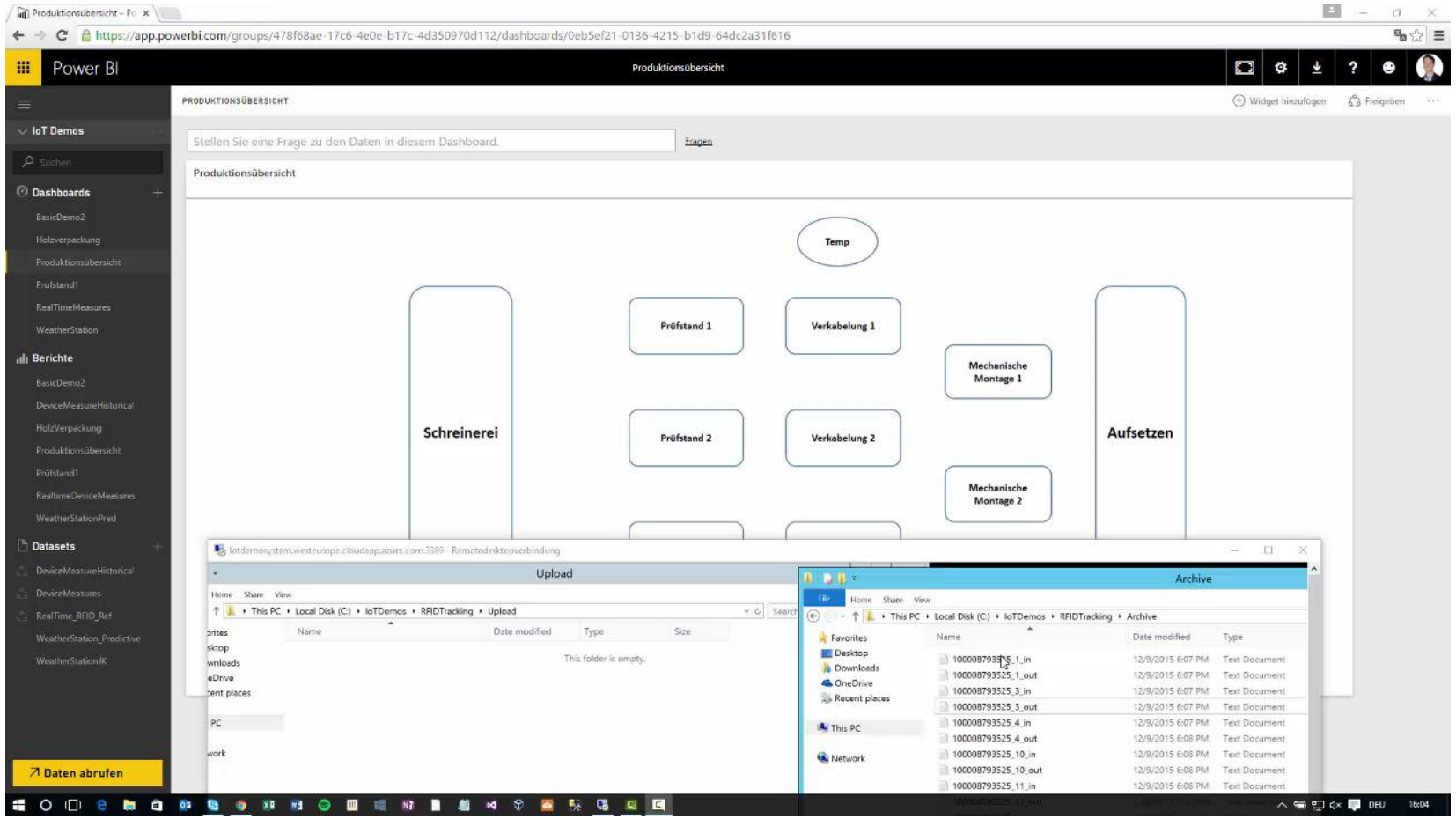
Grundfos solution (after 1st Innovation Lab)





Grundfos optimizes Assembly of Pumps with RFID and Azure IoT Suite

Starting small, winning big

Understand and Learn

- Improve setup and understand data

be think innovate

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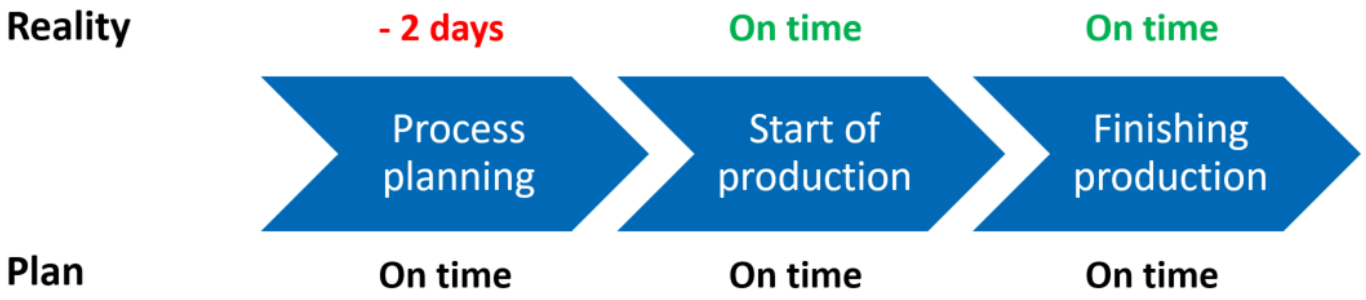
Grundfos optimizes Assembly of Pumps with RFID and Azure IoT Suite

ORAYLIS INNOVATION LAB

Current State order flow



be think innovate

GRUNDFOS

Innovieren – Think Big, Start Small (Fail Fast)

ORAYLIS INNOVATION LAB

- **Think Big**
- **Start Small**
- **Discover Visual**
- **Scale Fast**

Microsoft

ORAYLIS Business Intelligence

Go try

Microsoft Azure kostenlos testen:
http://azure.microsoft.com/de-de/pricing/free-trial/

AzureML:
http://azure.microsoft.com/en-us/services/machine-learning/

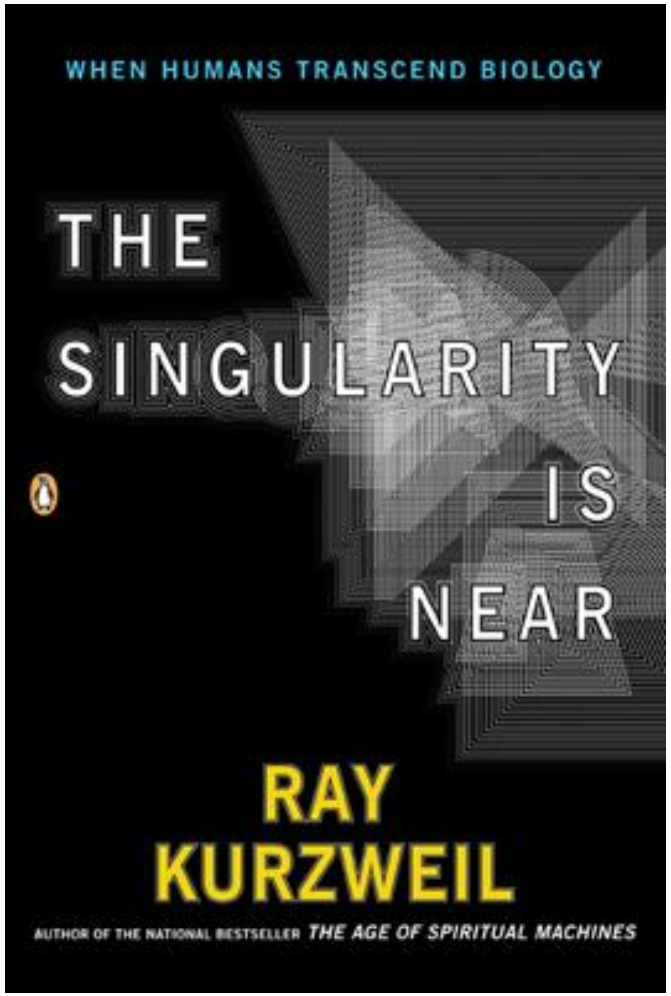
Azure Preisreichner:
https://azure.microsoft.com/de-de/pricing/calculator/

ORAYLIS Blog: Jens Kröhnert: Data Scientist & Predictive BI
http://blog.oraylis.de/2014/11/innovation-lab-data-scientist-predictive-bi/

Download Power BI Designer (kostenlos):
https://www.powerbi.com/dashboards/downloads/

ORAYLIS TV: Jens Kröhnert: Power BI Serie
https://www.youtube.com/user/oraylisbi

„Mit Lambda zum intelligenten Unternehmen" – Jens Kröhnert im BI-Spectrum 2016/02
https://goo.gl/vgLvA6




Happiness
Neutral
Sadness

ORAYLIS Guide

- Reichhaltiges Angebot
  - Workshops
  - Campus Trainings
  - Innovation Labs

- Webseite: https://www.oraylis.de/guide

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