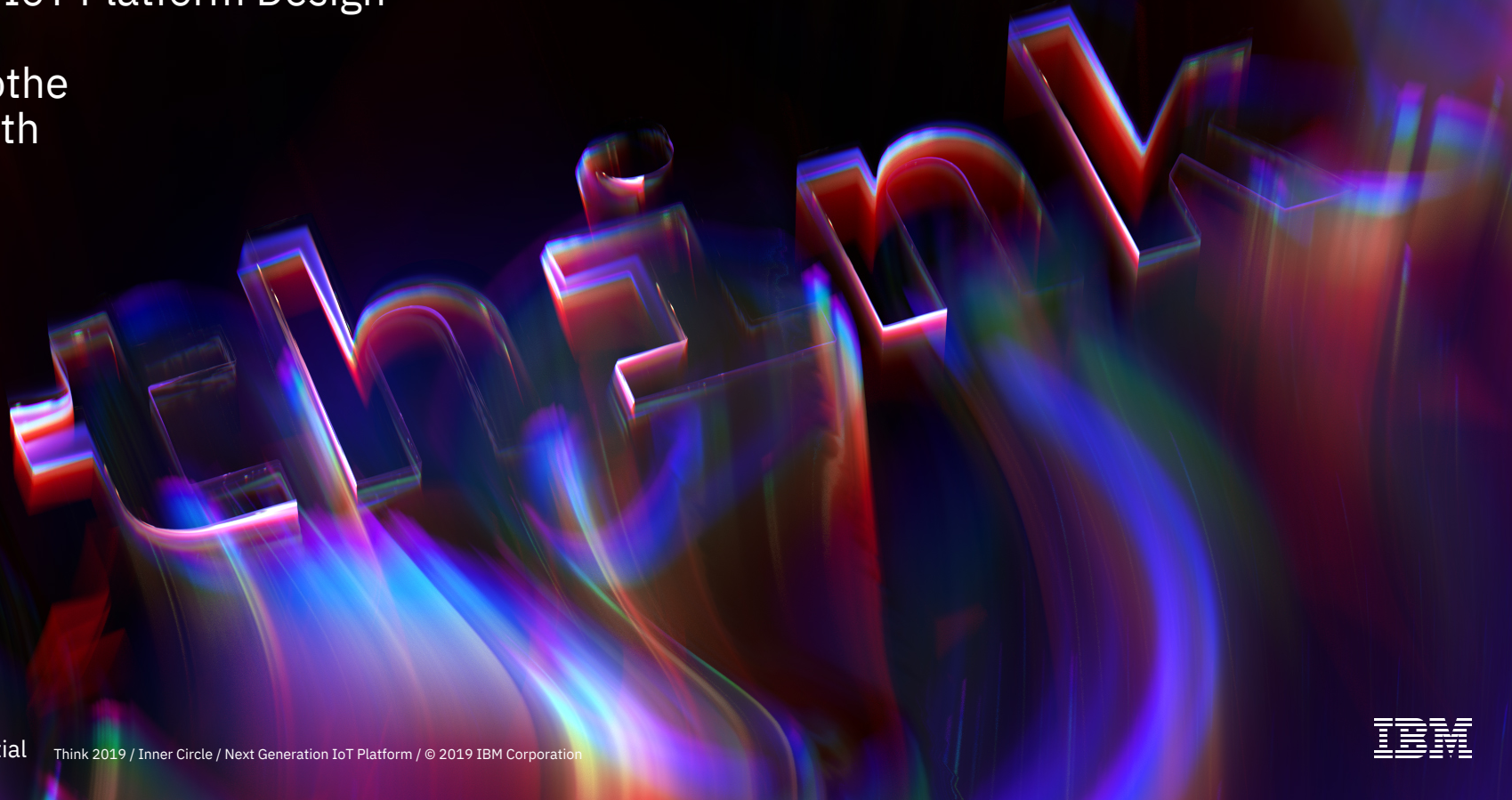


InnerCircle

7587 - What's New and Next in Watson IoT Watson IoT Platform Design

—
Mats Gothe
Luke Firth

think 2019



Please note

IBM's statements regarding its plans, directions, and intent are subject to change or withdrawal without notice and at IBM's sole discretion.

Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision.

The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract.

The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.

Performance is based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput or performance that any user will experience will vary depending upon many factors, including considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve results similar to those stated here.

Notices and disclaimers

© 2019 International Business Machines Corporation. No part of this document may be reproduced or transmitted in any form without written permission from IBM.

U.S. Government Users Restricted Rights — use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM.

Information in these presentations (including information relating to products that have not yet been announced by IBM) has been reviewed for accuracy as of the date of initial publication and could include unintentional technical or typographical errors. IBM shall have no responsibility to update this information. **This document is distributed “as is” without any warranty, either express or implied. In no event, shall IBM be liable for any damage arising from the use of this information, including but not limited to, loss of data, business interruption, loss of profit or loss of opportunity.** IBM products and services are warranted per the terms and conditions of the agreements under which they are provided.

IBM products are manufactured from new parts or new and used parts. In some cases, a product may not be new and may have been previously installed. Regardless, our warranty terms apply.”

Any statements regarding IBM's future direction, intent or product plans are subject to change or withdrawal without notice.

Performance data contained herein was generally obtained in a controlled, isolated environments. Customer examples are presented as illustrations of how those

customers have used IBM products and the results they may have achieved. Actual performance, cost, savings or other results in other operating environments may vary.

References in this document to IBM products, programs, or services does not imply that IBM intends to make such products, programs or services available in all countries in which IBM operates or does business.

Workshops, sessions and associated materials may have been prepared by independent session speakers, and do not necessarily reflect the views of IBM. All materials and discussions are provided for informational purposes only, and are neither intended to, nor shall constitute legal or other guidance or advice to any individual participant or their specific situation.

It is the customer's responsibility to insure its own compliance with legal requirements and to obtain advice of competent legal counsel as to the identification and interpretation of any relevant laws and regulatory requirements that may affect the customer's business and any actions the customer may need to take to comply with such laws. IBM does not provide legal advice or represent or warrant that its services or products will ensure that the customer follows any law.

Notices and disclaimers continued

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products about this publication and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products. IBM does not warrant the quality of any third-party products, or the ability of any such third-party products to interoperate with IBM's products. **IBM expressly disclaims all warranties, expressed or implied, including but not limited to, the implied warranties of merchantability and fitness for a purpose.**

The provision of the information contained herein is not intended to, and does not, grant any right or license under any IBM patents, copyrights, trademarks or other intellectual property right.

IBM, the IBM logo, ibm.com and [names of other referenced IBM products and services used in the presentation] are trademarks of International Business Machines Corporation, registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at “Copyright and trademark information” at: www.ibm.com/legal/copytrade.shtml.

Contents

Welcome to this Inner Circle Design Session

In this session we will

- Explore the 2019 design priorities for Watson IoT Platform
- Discuss your business and capability needs
- Use hand-out and on-line surveys to collect your feedback

We will also use a ‘needs board’ to track your requests and priorities on discussed topics

Contents

Introductions

Watson IoT Platform Design

IBM Design

2019 WIoT Platform Designs and Priorities

Integrated Platform Experience

Device Management

Analytics

Wrap-up

Join the IoT Platform Design Partner Program

Design is the intent behind an outcome

IBM Design

IBM Design Ethos | Philosophy
& Principles

IBM Design Thinking | Observe, Reflect, Make
Hills, Playbacks, Sponsor Users

IBM Design Language | Elements and expression
For all IBM Design Practices

IBM Design System | 2x Grid, Color, Typography, Icons,
Components, Motion

IBM Design Practices | Brand, Product, Digital, Industrial,
Communications, Event, Environmental,
Service Design, and Education

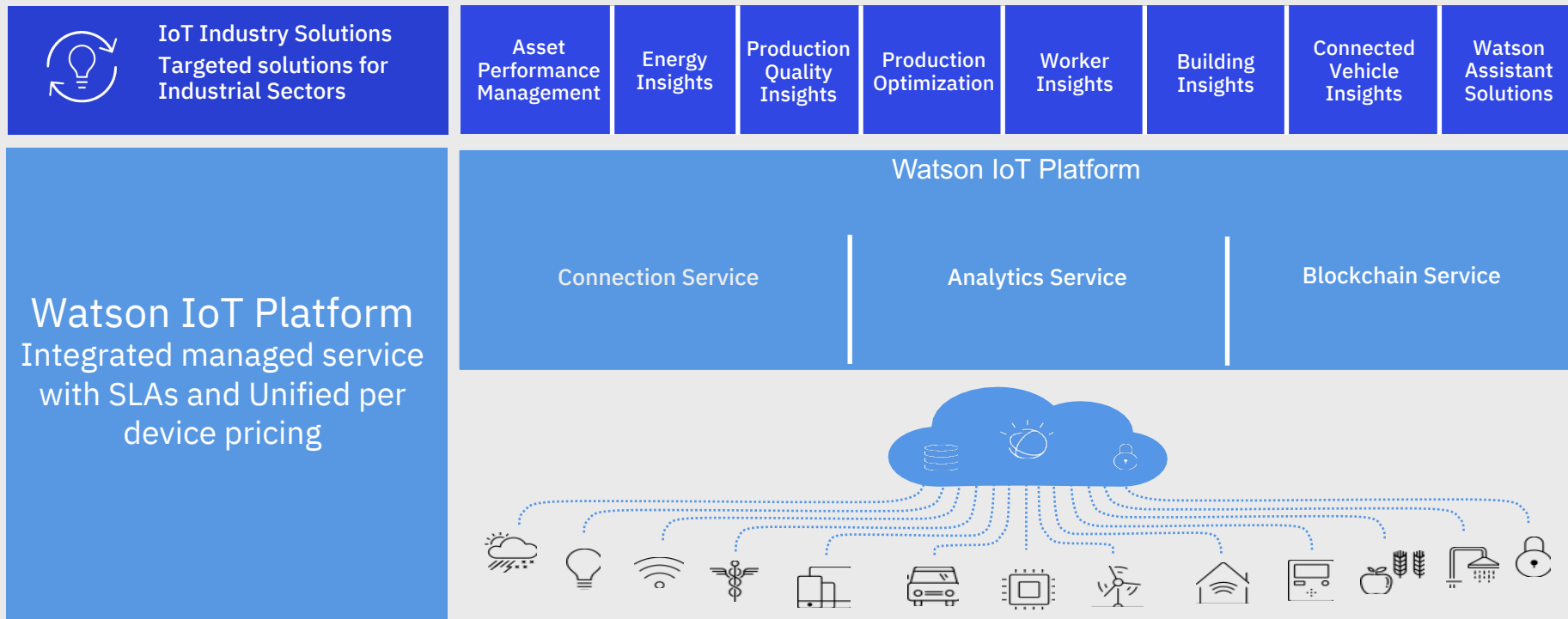
2019 WIoTTP Designs and Priorities

> Integrated Platform Experience

Analytics

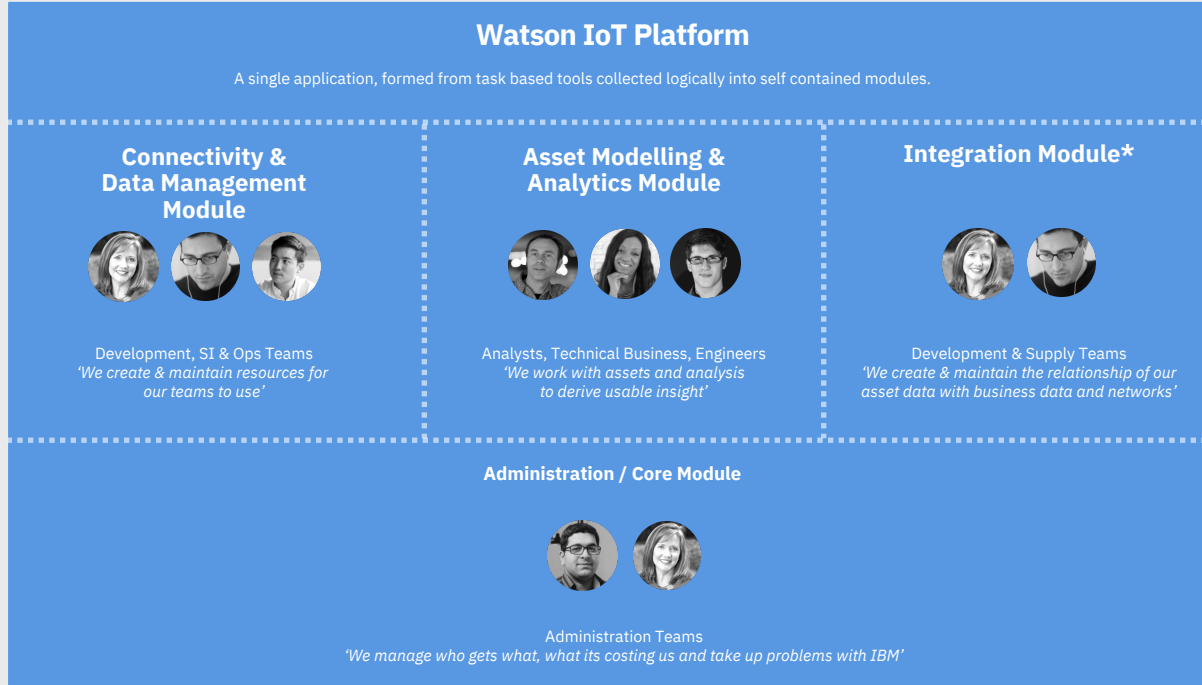
Device Management

Watson IoT Platform serves as a foundational capability for our industry solutions and business use cases



Integrated Platform Experience

Design the offering to reflect the naturally grouped tasks / user groups we know today into modules, then UI, docs and teams follow that structure.

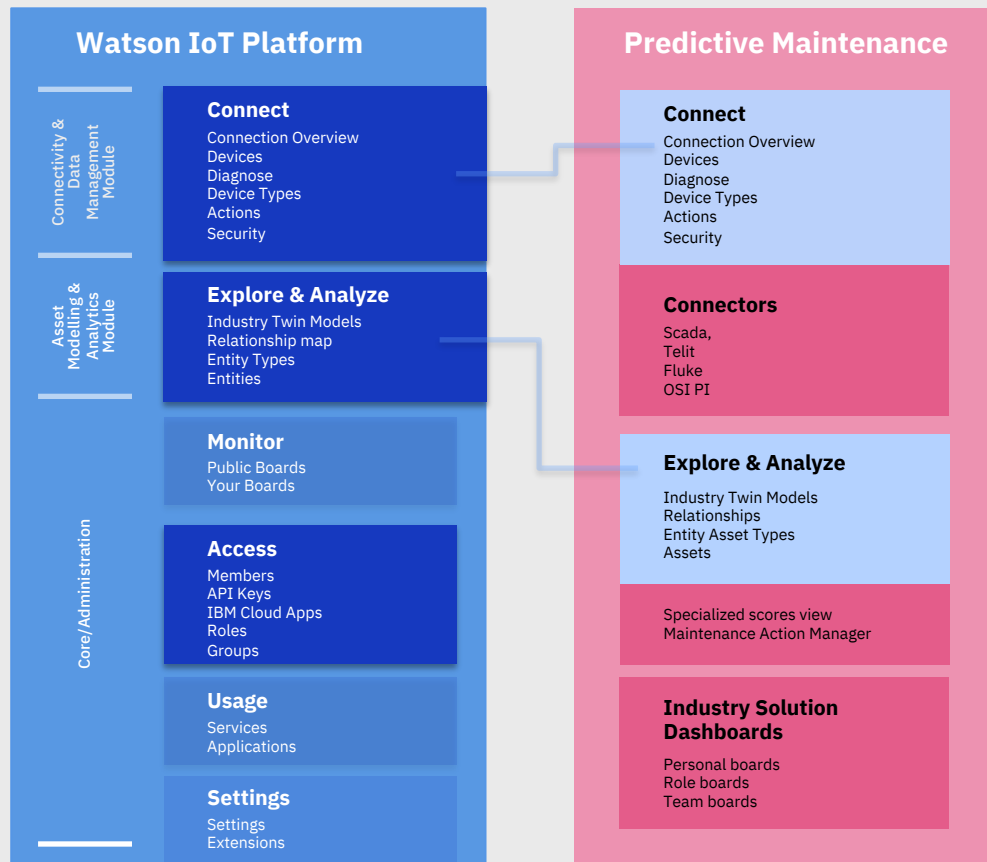


Integrated Platform Experience

Design the portfolio of IoT offerings to reflect any common and naturally reused modules of tasks and user group structures to achieve consistency and usability.

For example,

- IoT Device Management
- Digital Twins
- IoT Analytics
- Data Visualizations
- User Management and Access



Integrated Platform Experience

Connect

Explore & Analyze

Monitor

Access

Services & Usage

Settings

IBM Watson IoT Platform

IoT Platform Device Connection

Devices | Device Types | Actions | Diagnose | Interfaces | Security

Q Type the name to search for

This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API.

Device ID

Device Type

Class ID

Date Added

> ☐ ExampleDevice_1

Pump

Device

Mar 22, 2018 12:49 PM

> ☐ ExampleDevice_2

Pump

Device

Mar 22, 2018 12:49 PM

> ☐ ExampleDevice_3

Boiler

Device

Mar 22, 2018 12:49 PM

> ☐ ExampleDevice_4

Powerplug

Device

Mar 22, 2018 12:49 PM

> ☐ ExampleDevice_5

Pump

Device

Mar 22, 2018 12:49 PM

> ☐ ExampleDevice_6

Boiler

Device

Mar 22, 2018 12:49 PM

> ☐ ExampleDevice_7

Boiler

Device

Mar 22, 2018 12:49 PM

> ☐ ExampleDevice_8

Powerplug

Device

Mar 22, 2018 12:49 PM

Items per page: 10 | 1 - 10 of 40 items

2 of 4 pages < 2 >

Add Device

My Applications

Asset Performance Management

Building Insights

My Services

Cloudant NoSQL DB

DB2 Warehouse on Cloud

Object Storage

IBM Event Streams

Integrated Platform Experience



This design would deliver a foundation to achieve:

"As a line-of-business depending on connected assets, we can order and provision an industry solution with a built-in IoT platform on public or private cloud, with pre-configures industry models that provides device connections and data analytics insights, surfacing as industry specific metrics for my LOB engineers"

Integrated Platform Experience

Your feedback and priorities

- **Your current use of the Next Generation Watson IoT Platform?**
 - Watson IoT Platform Service
 - Watson IoT Platform Connection Service
 - Watson IoT Platform Analytics Service
- **Your current use of other Watson IoT Industry Solutions?**
- **Your business needs for an integrated IoT, DevOps, and Analytics platform experience?**
- **Your needs for common IoT Platform and Solution capabilities?**
 - User management
 - Access control
 - Rules and Actions
 - Digital Twin model
 - Predictive analytics
 - Reporting and Dashboards

2019 WIoTTP Designs and Priorities

Integrated Platform Experience

> Analytics

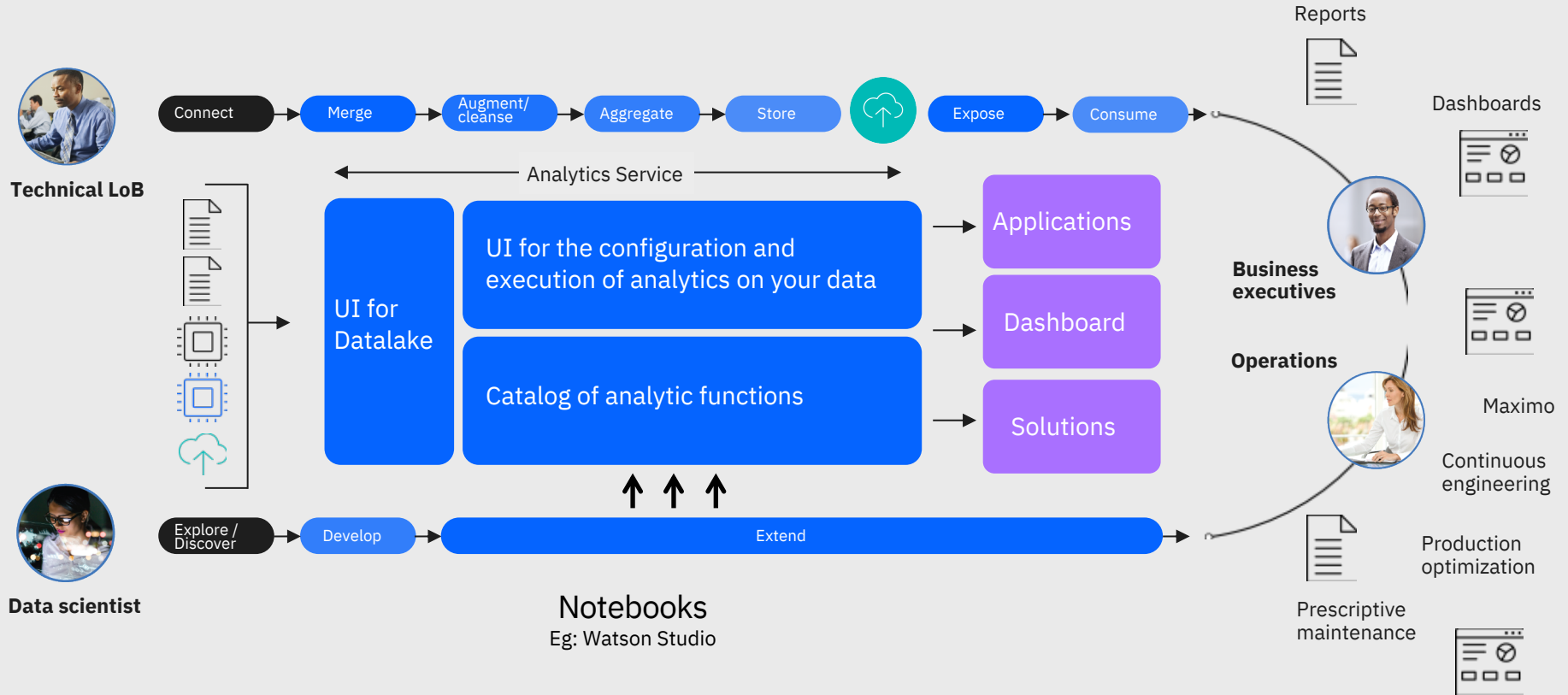
Device Management

Watson IoT Platform Analytics

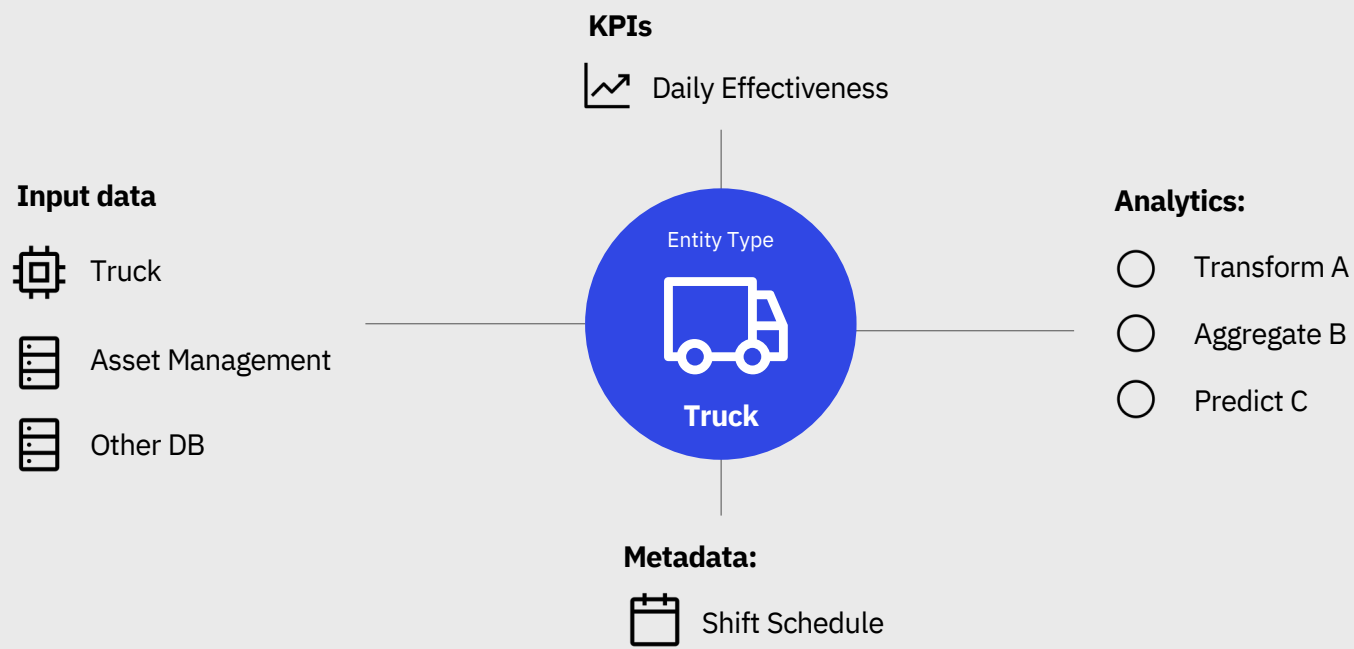
Watson IoT Platform Capabilities for Analytics

- Entities and Entity Types
- Functions for analysis
- Function Catalog

Enabling a new workflow



Introducing Entities



Introducing Functions

“Leak Detection”

Check for leaks and other flow irregularities by comparing inflows & outflows.

$$\text{SUM total } \underline{\text{inwards flow}} - \text{SUM total } \underline{\text{outwards flow}} > \underline{\text{Loss threshold}}$$

select data items

select data items

type constant



Data scientist



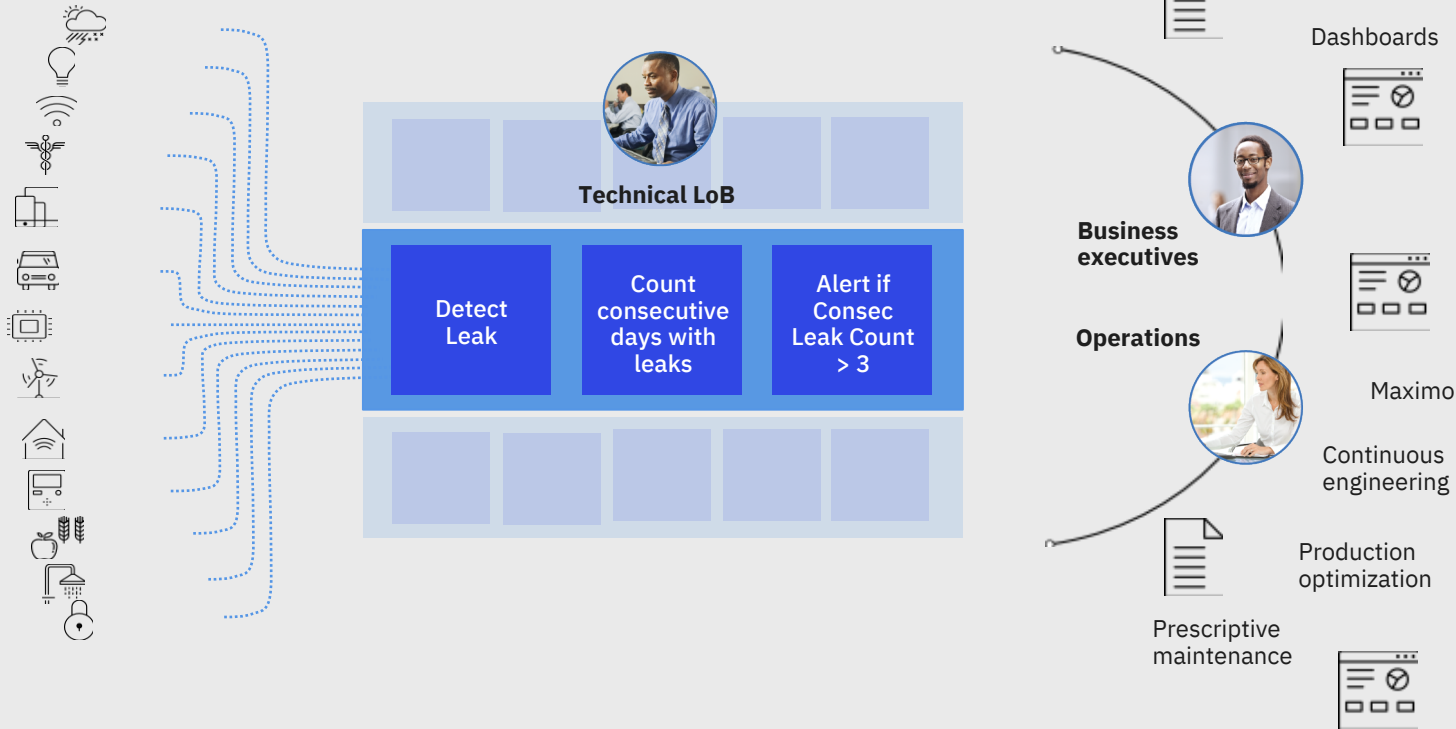
Catalog



Technical LoB

A screenshot of a software configuration window titled 'Model_Y_808-A Leak Detection'. The window has a close button (X) in the top right. Below the title, it says 'Check for leaks and other flow irregularities by comparing input flows with output flows'. There are two tabs: 'Configuration' (selected) and 'Output'. Under 'Configuration', there are three sections: 'Inward_flows' with a dropdown menu showing 'Data Items', 'Outward_flows' with a dropdown menu showing 'Data Items', and 'Loss_threshold' with a text input field containing 'Enter number'. At the bottom right, there are 'Cancel' and 'Next' buttons. The window is layered over other similar windows, suggesting a sequence of steps.

Automatically composed into Pipelines



Analytics Experience

Model_Y_808-A

FlowRateMonitor

Check for leaks and other flow irregularities by comparing input flows with output flows

Configuration

Output

Input_flows 1

Data Items

Output_flows 1

Data Items

☐ load

☐ discharge

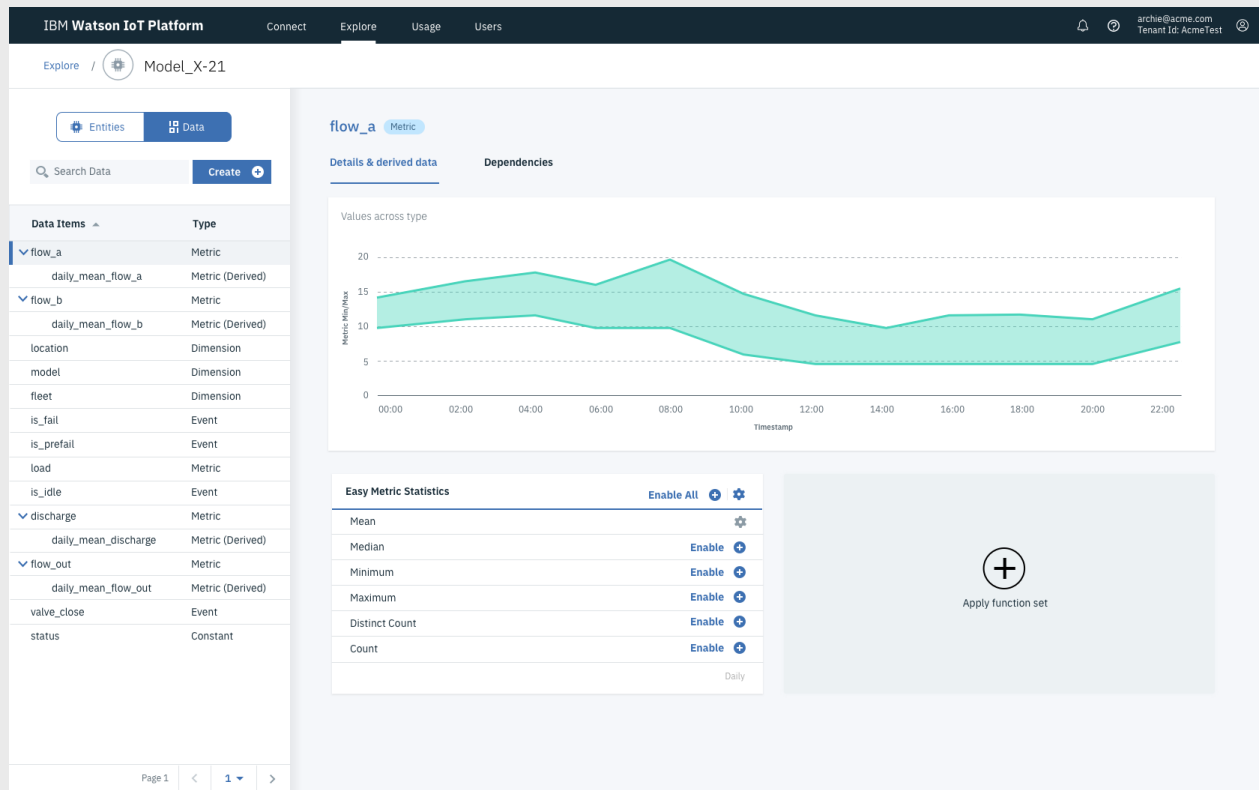
☐ daily_mean_discharge

☐ flow_out

☒ daily_mean_flow_out

Cancel

Next



Page 1 < 1 >

Analytics Design Hills



This design would deliver :

"An LoB Asset SME can work with their data science teams to uncover deep insights from their data, performing multiple styles of analysis from a single experience without rebuilding complex analysis rules"

Analytics

Your feedback and priorities

- **Your business priorities on analytics?**
 - Getting started – Guidance on what analysis is available, recommendations?
 - Everyday use – Apply and validate analysis and its outputs?
 - Maintain – Manage and monitor analytic system performance, results, data quality?
- **Your capability needs on analytics?**
 - Discovery phase of slice and dice data to see what analysis to undertake?
 - Detailed control over how, and when your analysis runs?
 - Ability to instill ‘domain’ knowledge into the system for analysis to leverage?
 - Ability to visualize the outputs in composable dashboards?

2019 WIoTTP Designs and Priorities

Integrated Platform Experience

Analytics

> Device Management

Watson IoT Platform Device Management

Watson IoT Platform Capabilities for DevOps

- Device registration
- Device health
- Device monitoring
- Device management commands
- Device connection security

Device Management Design Hills



This design would deliver :

"A LOB DevOps team can through device metrics collected by the platform and device health rules and predictive models be notified about anomalous device behavior and easily troubleshoot and resolve issues using recommended actions"

Device Health Metrics

Connection Status: Connected / Disconnected

- How was the last connection terminated
 - by the client, timeout
- Timestamp of last connection
- Timestamp of last disconnect
- What was the last activity event
 - Connect, Disconnect, Message sent
- Timestamp of last activity
- MQTT protocol version
- MQTT reason code

The API provides filtering options that included querying by timestamp:

- Filter based on connection time
- Filter based on disconnect time
- Filter based on activity time (this allows the user to query for devices that have not sent a message within a specific time window)

The WIoT UI provides

- Device drill-in with health metrics
- Device table view with health metrics
- Search and filter

Device Health Metrics

[illegible]

Additional Device Management Design Hills



This design would deliver :

“A LOB DevOps and Services team can schedule and run device management campaigns with actions and device configurations updates to groups of devices and (rapidly) within a minute get updates out where they need to be to close an asset work order”

“A LOB DevOps team can commission and provision devices in the scale of tens of thousands when deploying industry solution devices, with built in provisioning and device management, out of the box”

Device Management

Your feedback and priorities

- **Your business priorities on device management?**
 - Getting started - Need device commissioning and provision
 - Everyday use - Need health and anomaly detection with actions
 - Maintain - Need campaign management
- **Your capability needs on device management?**
 - Device health metrics
 - Notifications and Dashboard
 - Campaigns
 - Provisioning service
- **Your integration needs with 3rd party device management offerings?**

Contents

Introductions

Watson IoT Platform Design

IBM Design

2019 WIoT Platform Designs and Priorities

Integrated Platform Experience

Device Management

Analytics

Wrap-up

Join the IoT Platform Design Partner Program

Become a Design Sponsor

Join the Design Partner Program

The Watson IoT Platform Design Partner Program (DPP) is a group of selected clients and partners that are building, integrating and deploying IoT solutions using the Watson IoT Platform.

The members of the DPP are meeting monthly with IoT Platform offering management, design and development to learn about new IoT Platform capabilities in the roadmap and to provide their feedback and guidance on priorities.

Join the IoT Platform Design Partner Program



Mail us at
IOTDPP@us.ibm.com



Sign up at
<https://ibm.biz/Bd2jmY>

Thank you

Mats Gothe
Senior Technical Staff Member
Senior Design Lead Watson IoT Platform

—

mats.gothe@se.ibm.com
+46.70.7932322
ibm.com

Luke Firth
UX Design Lead :: Analytics in Watson IoT

—

lukefirth@uk.ibm.com
+44-7480114166
ibm.com



2019 WIoTTP Designs and Priorities

IBM Cloud Private

Why Watson IoT Platform on Cloud Private

Public Cloud offerings

- Watson IoT Platform on ICP in a region where there is no IoT offering on a public cloud

Data Sovereignty

- Comply with regional, security or data residency regulations and corporate standards

Availability and Control

- For applications that can not rely on internet connections, or trust public cloud availability

On premise integration with Industry Solutions

- Achieve integration with industrial equipment and solutions, and perform data collation, analytics and control at high data volumes

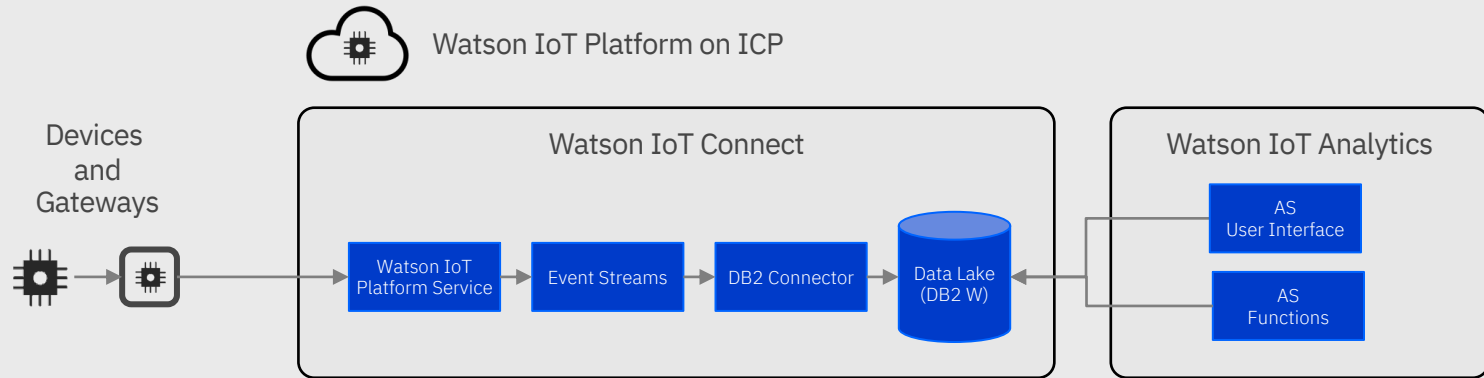
Watson IoT Platform on Cloud Private

- **Watson Industry Solutions on ICP with integrated Watson IoT Platform services**
 - Subset of WIoTP fulfilling functional needs for on-prem IoT industry solution
 - WIoTP install and operations as part of IoT industry solution
- **Watson IoT Platform on ICP as managed service by IBM**
 - Subset of WIoTP fulfilling specific regional and client needs
 - WIoTP install and operations by IBM
- **Full Watson IoT Platform as an ICP offering**
 - Full Watson IoT Platform in parity with Public Cloud
 - Target is customers who need WIoTP capabilities but can't use Public Cloud for some or all of their solution
 - Order, Install, Configure and Operate by Client
(limitations on DevOps toolset may apply)

Watson IoT Platform – Cloud Private

Watson IoT Platform on Cloud Private will include

- Watson IoT services on ICP
- Watson IoT Platform User Interface and APIs
- Installed, Configured and Operated by Client or System Integrator



Cloud Private (ICP) Design Hills

2019 delivery phases



This design would deliver :

*“An industrial enterprise LOB, can **through a DevOps lab service contract**, deploy a **subset of Watson IoT Platform** services on a managed private cloud, to ingest and analyze IoT data from connected devices and comply with regional, security or data residency requirements.”*

Cloud Private (ICP) Design Hills 2019 delivery phases



This design would deliver :

*“An industrial enterprise LOB, can **through a DevOps lab service contract**, deploy the Watson IoT Platform services on a managed private cloud, **in parity with IBM Public Cloud**, but sized for the their needs.”*

Cloud Private (ICP) Design Hills

2019 delivery phases



This design would deliver :

*“An industrial enterprise LOB, **through their internal IT and DevOps** administration, deploy, configure, manage and maintain the Watson IoT Platform services on their elastic client managed private cloud, **using DevOps administration toolset for WIOTP on ICP.**”*

Cloud Private (ICP)

Your feedback and priorities

- **Your business priorities on Cloud Private?**
 - Deploy where there is no public cloud
 - Keep my data private and secure, within my regulatory compliance boundaries
 - Have my whole (industrial) infrastructure on premise and on cloud private
- **Your priorities on IoT Platform capabilities**
 - On-prem cloud private or Public cloud private
 - Self administered or Managed cloud private
 - Full or reduced IoT Platform capabilities on cloud private
- **Your priorities on IoT Platform services**
 - Full Watson IoT Platform in parity with Public Cloud
 - Device Registry, Device Management, MQTT / LTS Support
 - Data Management, Real-Time Rules and Actions
 - Last Event Cache
 - Watson IoT Platform User Interface and Dashboards

2019 WIoTTP Designs and Priorities

IoT Edge

Watson IoT Platform – IoT Edge

Watson IoT Platform Capabilities for IoT Edge

- IBM Edge Fabric
- IoT Edge Nodes and Gateways
- IoT Edge Service Catalog

Why IoT Edge

Laws of Edge

- Device data values are growing and transmitting to the cloud is unworkable in many cases
- Systems require rapid reaction times and cloud round trip introduce unacceptable latency
- Data privacy and regulations require data to remain at the edge

Edge devices are becoming more powerful

- Many Edge nodes are capable of significant processing
- Data gravity is driving computation and analytics closer to the data

Edge use-cases across all industries

- The edge are driving use-cases across Manufacturing, Electronics, Automotive, Natural resources, Healthcare.

IoT Edge Design Hills

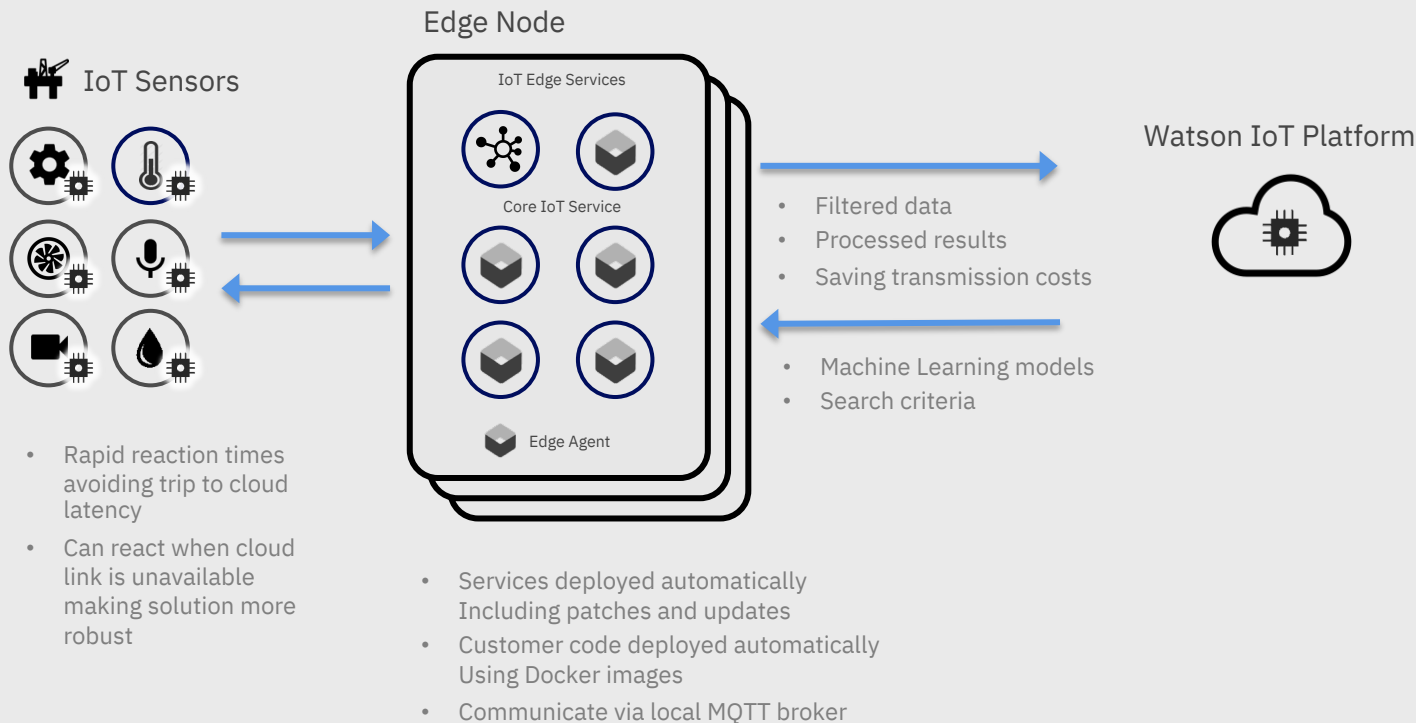


This design would deliver :

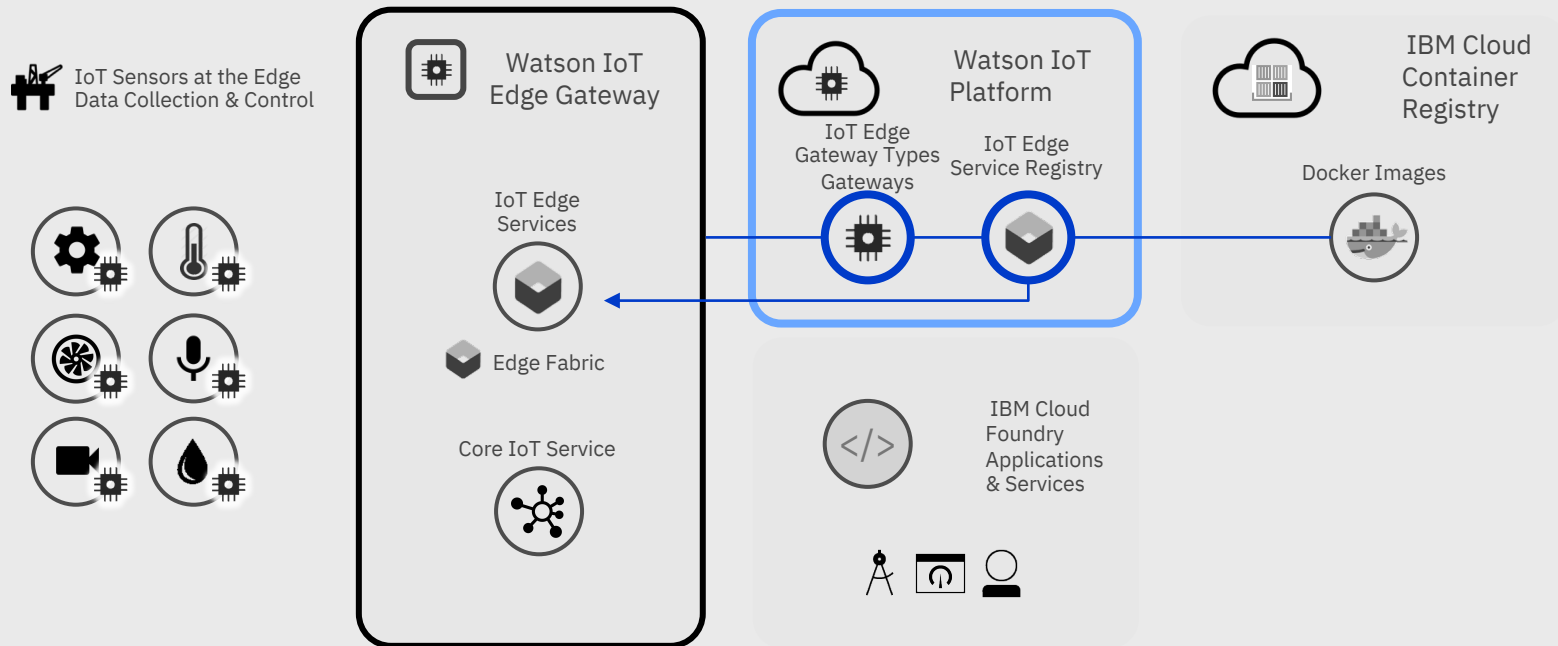
“A LOB development organization building an instrumented infrastructure, can compose a system of run-time service components, that provides scale at the cloud and re-distribute workloads to the edge to meet changing business computing demands”

“An IoT Edge developer, can build modular edge analytic and control code that integrates devices with the compute power of edge gateways and modern cloud programming models”

Watson IoT Platform Edge Offering



Watson IoT Platform – IoT Edge Topology



Creating a new IoT Edge Gateway Type

The screenshot shows the 'Add Type' dialog in the IBM Watson IoT Platform. The dialog has a dark blue header with the platform name and navigation links. A sidebar on the left contains icons for various platform features. The main content area is titled 'Add Type' and has tabs for 'Identity', 'Device Information', and 'Edge Services'. The 'Identity' tab is active. It contains a 'Select Type' section with a description of device types. Below this, there are input fields for 'Type' (with 'Device' and 'Gateway' buttons), 'Name' (with the value 'EdgeGatewayTypeZ' and a descriptive note), 'Description', 'Edge Services' (a toggle switch), and 'Architecture' (a dropdown menu set to 'ARM 32 bit (armhf)'). At the bottom right are 'Cancel' and 'Next' buttons.

IBM Watson IoT Platform

QUICKSTART SERVICE STATUS DOCUMENTATION BLOG mats.gothe@se.ibm.c... ID: (Think IoT Edge Lab)

Browse Diagnose Action **Device Types** Manage Schemas

Add Type Identity Device Information Edge Services

Select Type

Device types group devices that have similar characteristics, such as model number, firmware version, or location. Give the device type a unique name and a description that identifies characteristics that are shared by devices of this type.

Type Or

Name
The device type name is used to identify the device type uniquely and uses a restricted set of characters to make it suitable for API use.

Description

Edge Services ☒

Architecture

Cancel Next

Select IoT Edge Services

IBM Watson IoT Platform

QUICKSTARTSERVICE STATUSDOCUMENTATIONBLOG

mats.gothe@se.ibm.c...
ID: (Think IoT Edge Lab)

Browse

Diagnose

Action

Device Types

Manage Schemas

Add Type

Identity

Device Information

Edge Services

Add Edge Service

Service Name	Version	Publish Date	Author
Edge Core IoT workload ⓘ	Version: 2.3.1	9 Mar 2018 10:07	IBM
Think Edge Sensor Lab for arm ⓘ	Version: 1.0.0	9 Mar 2018 10:07	ul4s84
Think Edge Analytics Lab for arm ⓘ	Version: 1.0.0	9 Mar 2018 10:07	ul4s84

Cancel

Done

Edge Services

+

Device Types

This table lists all device types that are defined. You can filter the list and search for the name and description. You can modify and configure existing device types and add new device types.

Configure IoT Edge Services

The screenshot shows the IBM Watson IoT Platform interface. At the top, the header includes 'IBM Watson IoT Platform', navigation links for 'QUICKSTART', 'SERVICE STATUS', 'DOCUMENTATION', and 'BLOG', and a user profile for 'mats.gothe@se.ibm.c...' with ID '(Think IoT Edge Lab)'. A left sidebar contains various icons for navigation. The main content area is titled 'Add Type' and has tabs for 'Identity', 'Device Information', and 'Edge Services'. The 'Edge Services' tab is active, showing a section titled 'Edge Services on this Gateway'. Below this, a message states: 'The Edge Core IoT service is added to all edge nodes, but you can select additional edge services to be added.' To the right of this message is a button labeled 'Add Edge Services' with a plus icon. There are three service cards displayed: 1. 'Edge Core IoT workload' with a description 'Image for Edge Core IoT workload'. 2. 'Think Edge Sensor Lab for arm' with a description 'Think Edge Sensor Lab workload that sends data to WIoTTP', a 'Configure' button with a gear icon, and a trash icon. 3. 'Think Edge Analytics Lab for arm' with a description 'Think Edge Analytics Lab workload that sends data to WIoTTP', a 'Configure' button with a gear icon, and a trash icon. At the bottom right of the dialog, there is a back arrow button and a 'Done' button.

IBM Watson IoT Platform

QUICKSTART SERVICE STATUS DOCUMENTATION BLOG mats.gothe@se.ibm.c... ID: (Think IoT Edge Lab)

Browse Diagnose Action **Device Types** Manage Schemas

Add Type Identity Device Information **Edge Services**

Edge Services

Edge Services on this Gateway

The Edge Core IoT service is added to all edge nodes, but you can select additional edge services to be added. Add Edge Services +

Edge Core IoT workload ⓘ
Image for Edge Core IoT workload

Think Edge Sensor Lab for arm ⓘ
Think Edge Sensor Lab workload that sends data to WIoTTP
Configure ⓘ

Think Edge Analytics Lab for arm ⓘ
Think Edge Analytics Lab workload that sends data to WIoTTP
Configure ⓘ

< Done

IoT Edge

Your feedback and priorities

- Your business priorities on IoT Edge?
- What IBM IoT Edge delivery models are relevant to you?
 - 'Pre-entitled' - IBM Edge Fabric pre-installed with your offerings
 - 'Add capability' - Partner IoT Edge offering delivered from IBM Cloud
 - 'Client applications' - Manage client IoT Edge workloads on IBM Cloud
- What IoT Edge Service are relevant to you?
 - MQTT Broker
 - Store and Forward
 - Rules and Actions
 - Predictive Analytics
 - Custom services