

Design Round-Table –
Internet of Things
Information Management Design

Mats Göthe
Senior Design Lead
Watson IoT Platform

Victoria Paterson
Senior Design Lead
Watson IoT Platform

InterConnect
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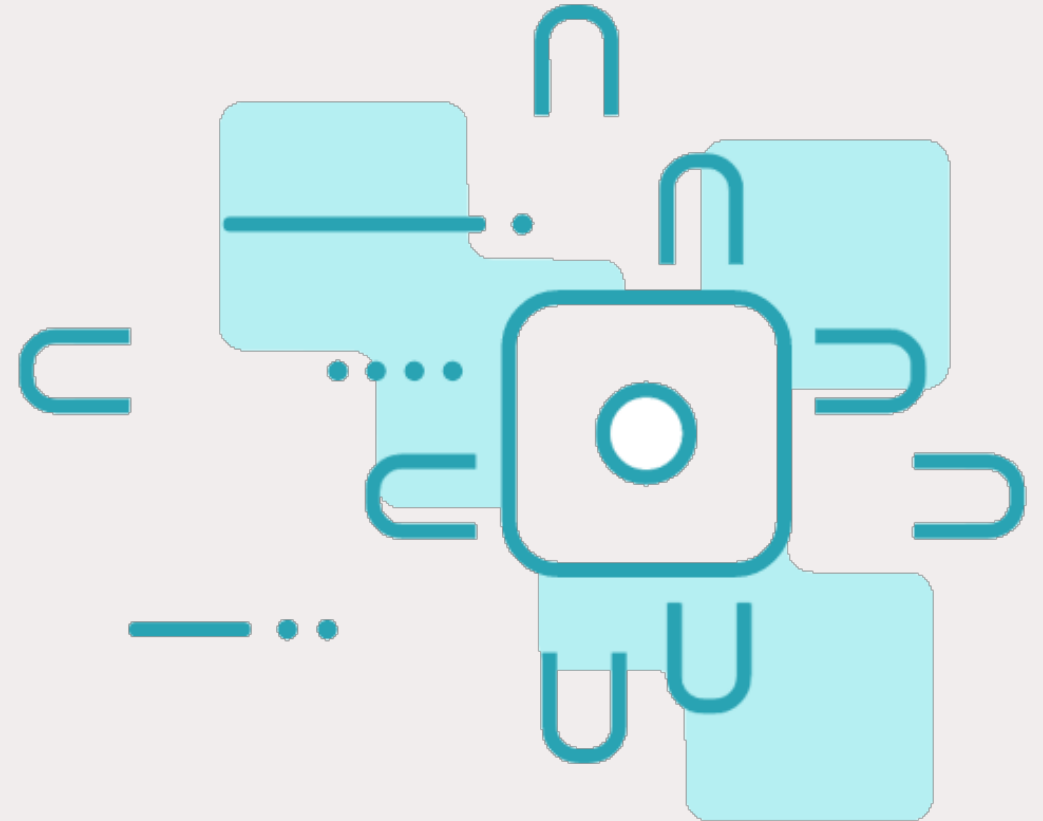
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Abstract

The Watson IoT Platform design puts users first in researching your usage patterns, use cases and needs.

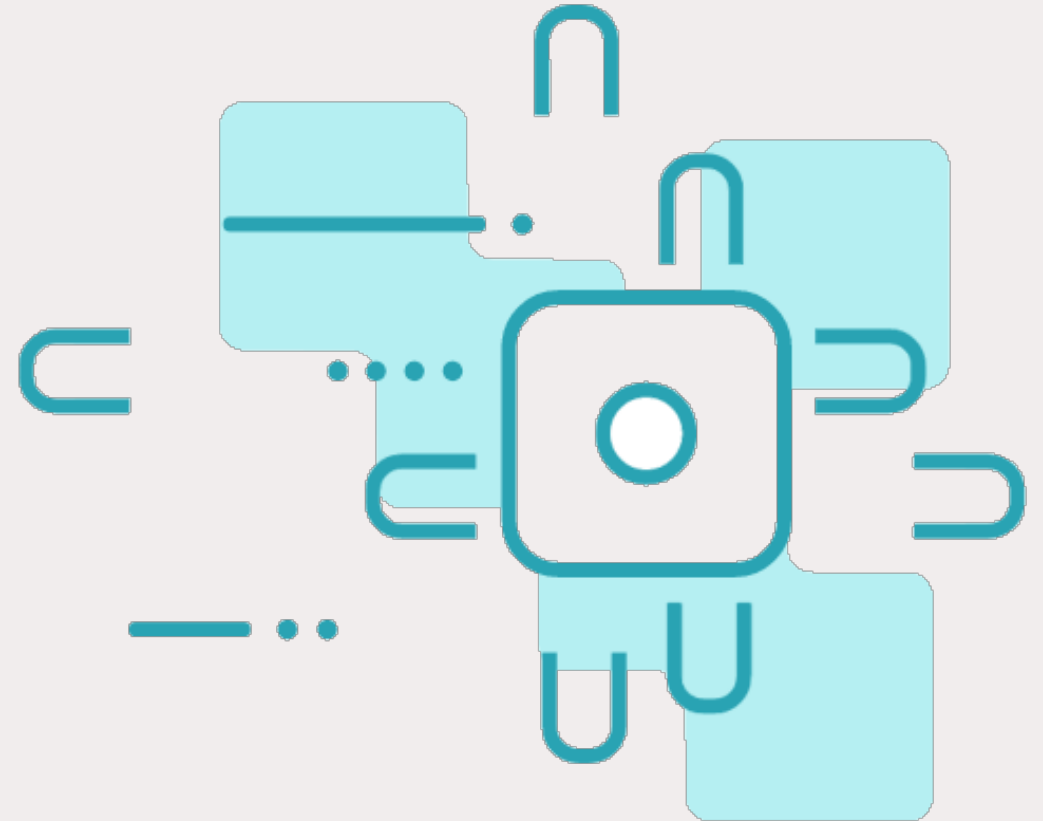
This roundtable session will present and discuss the IoT Platform Information Management experience.

Share your insights, needs, wants and requests for managing the information and programming model on devices and things in the IBM Watson Internet of Things Platform!



Agenda

- Introductions
- Discussion topics
 - Information Management
 - Working with the Information Model
- Summary and conclusions
- How to engage with Watson IoT Platform Design



Introduktions

– “Hi, I’m Mats, Design Lead for the IBM Watson IoT Platform”

Who are you?

- Your name
- Your company
- Your role



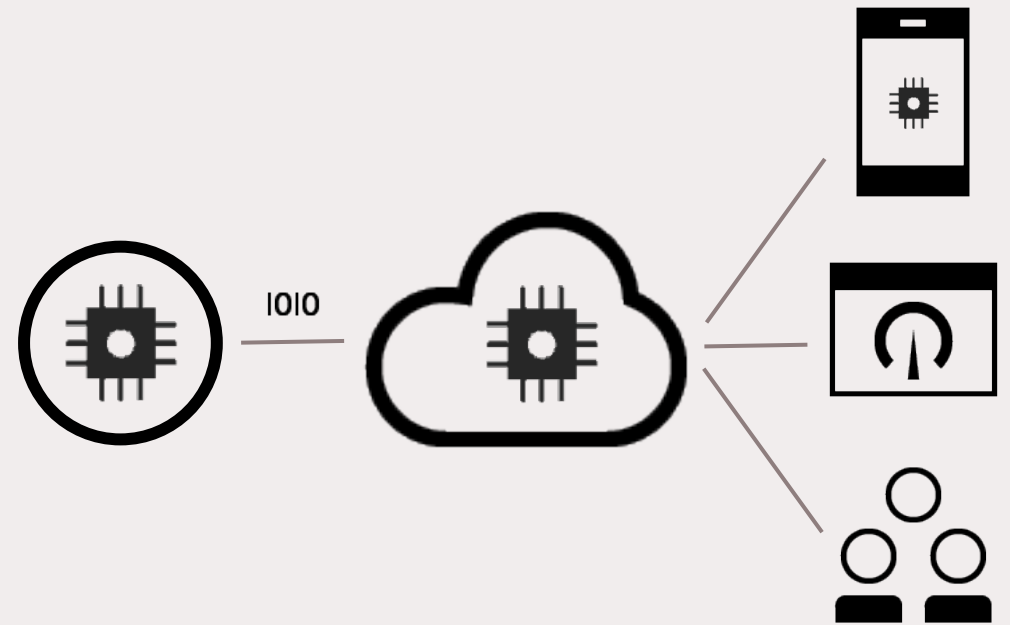
Information Management

What is Watson IoT Platform?

The IBM Watson Internet of Things Platform is a fully managed cloud-hosted service available in IBM Bluemix.

Devices connects and sends IoT data securely to the IBM Watson IoT Platform service using the MQTT messaging protocol.

From there, devices are managed using your online dashboard or secure APIs, so that IoT solutions and applications can access real-time device state and historical IoT data.



Why Information Management?

We observe that ...

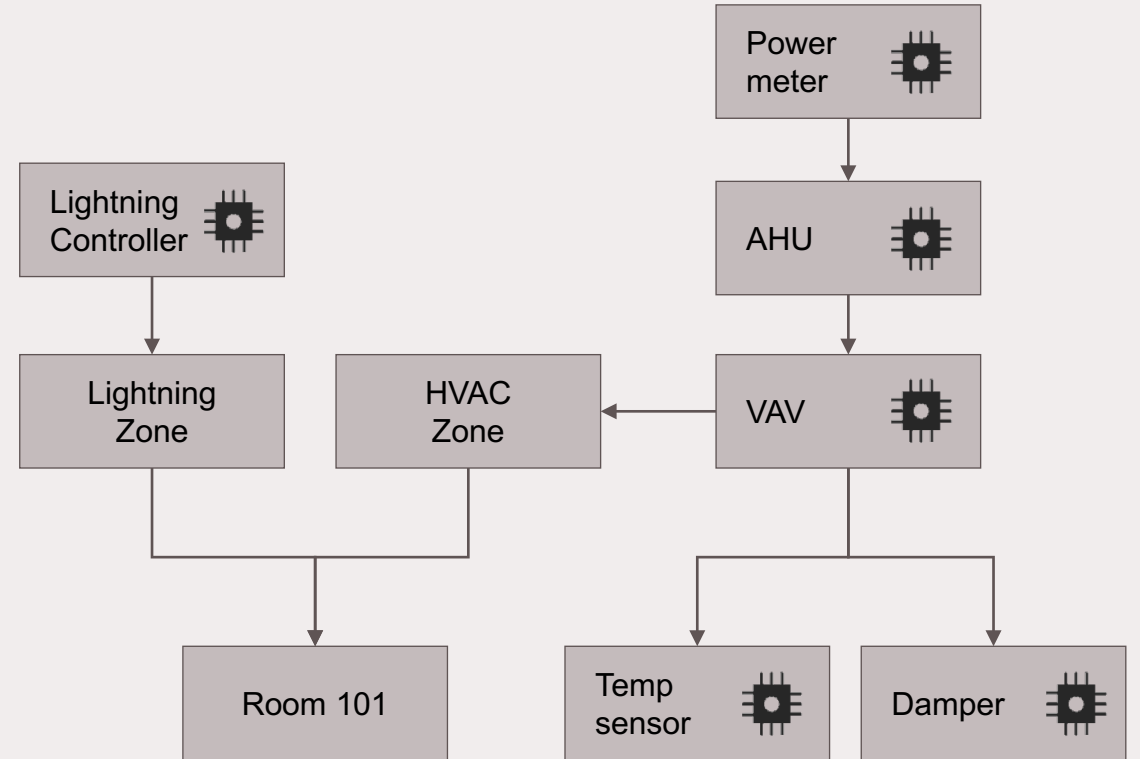
IoT solutions manage complex hierarchical relationship between maintainable assets, connected sensors and actuation devices

IoT solution development and maintenance are challenged by the variability and evolution of device types

IoT solution developers access assets and their state and face the complexities of how specific devices are instrumented and connected



What Information Management related problems do you see in your organization?

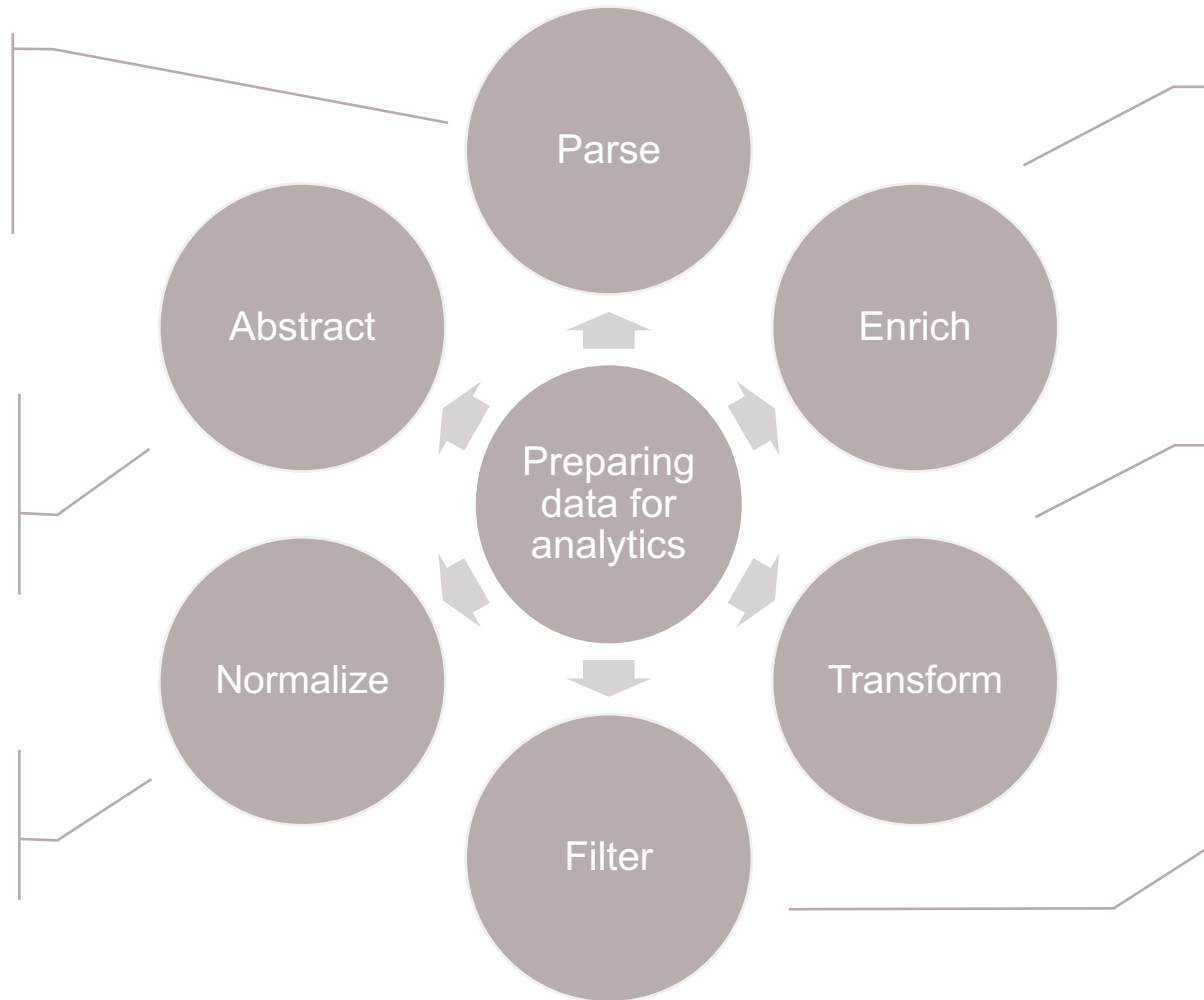


IoT Information Management Requirements

My devices send data in a binary format in order to reduce transmission costs but I need the data in JSON format for my app.

My devices operate in an event-driven manner but I need my application to be able to retrieve the current state in a REST-like manner.

I have multiple versions of devices but I need my application to interact with them all in the same way.



I need my application to combine data from my IoT devices with data from some other external data source (e.g. Weather).

My devices give me temperature in Fahrenheit but I need my application to read it in Celsius.

I just need the average temperature per hour from each device.

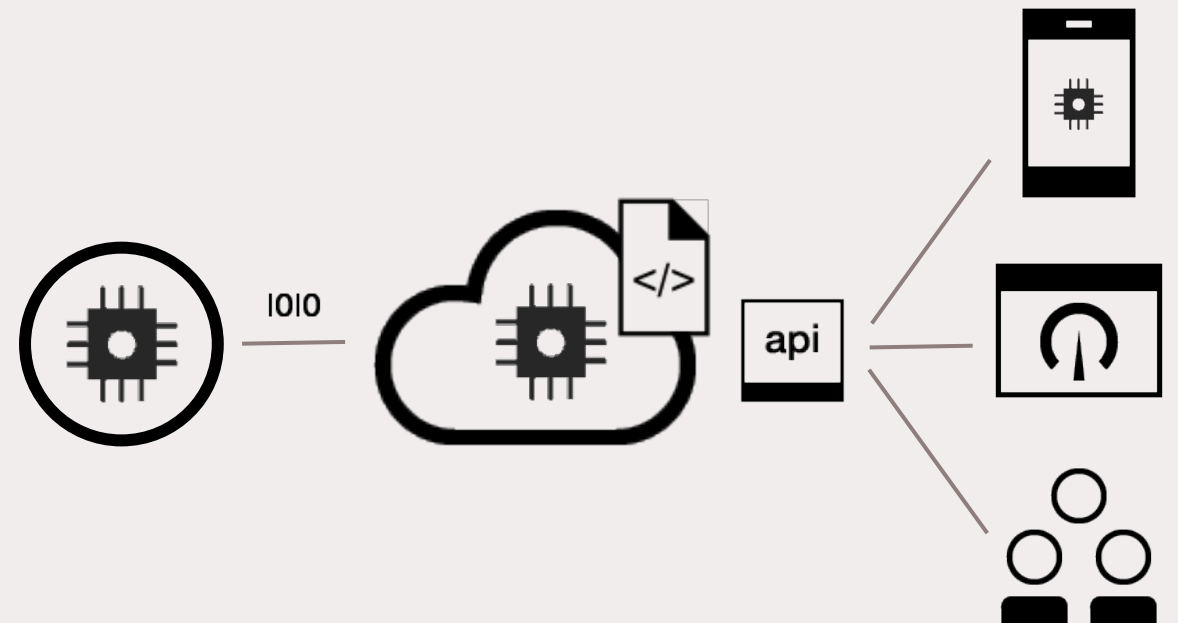
What is Watson IoT Platform Information Management?

IoT Platform Information Management ingest, transform and aggregate data from your IoT devices, diverse data sources and platforms into asset-based data structures.

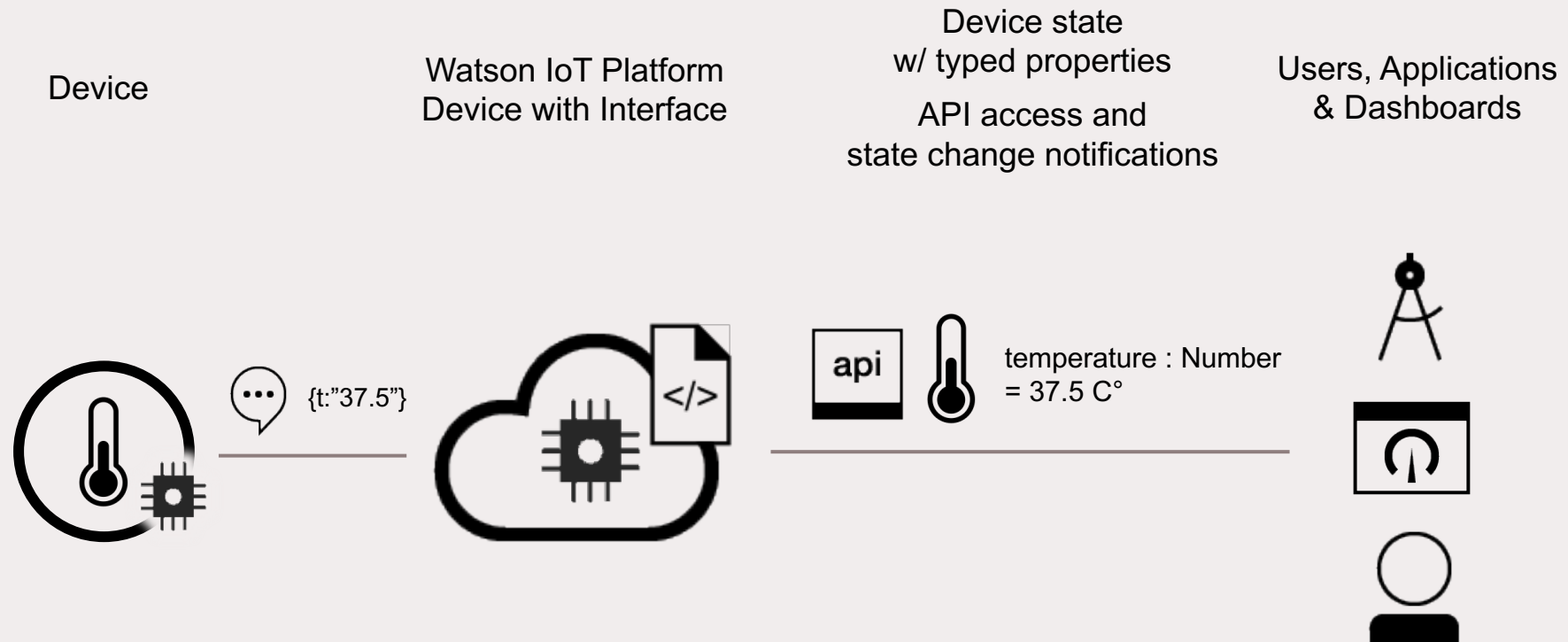
Information Management manages **reusable abstractions** of devices and aggregations into things.

Information Management provides an **event based processing pipeline** to transform, enrich and aggregate the state of devices and things.

Information Management provides **APIs and User Interfaces** to the manage the **information model** and interact with the state model of device and thing instances

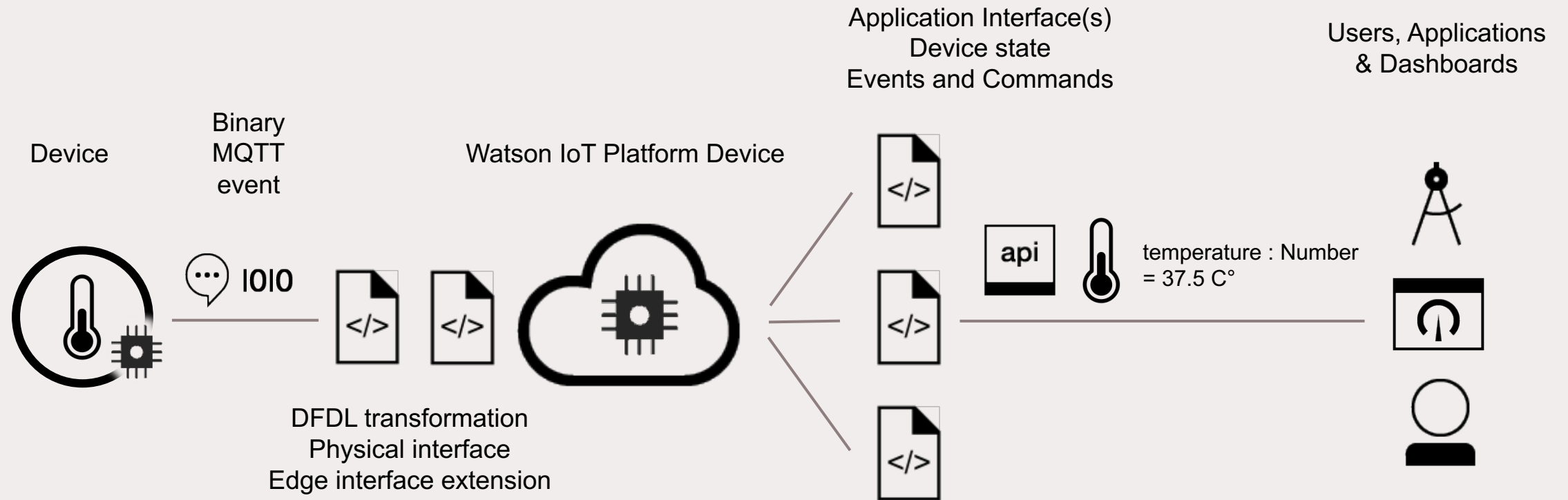


Device Abstractions



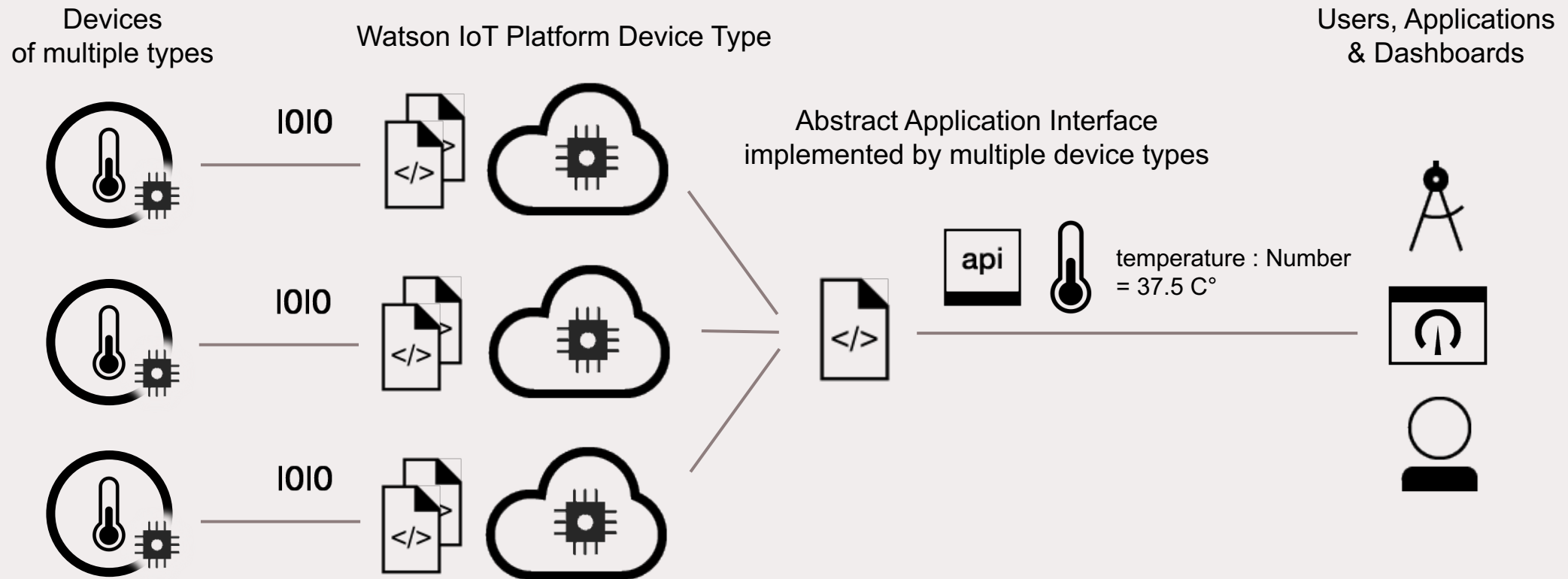
Model custom device data events and provide an information model of the devices and their state to users and applications

Device Abstractions



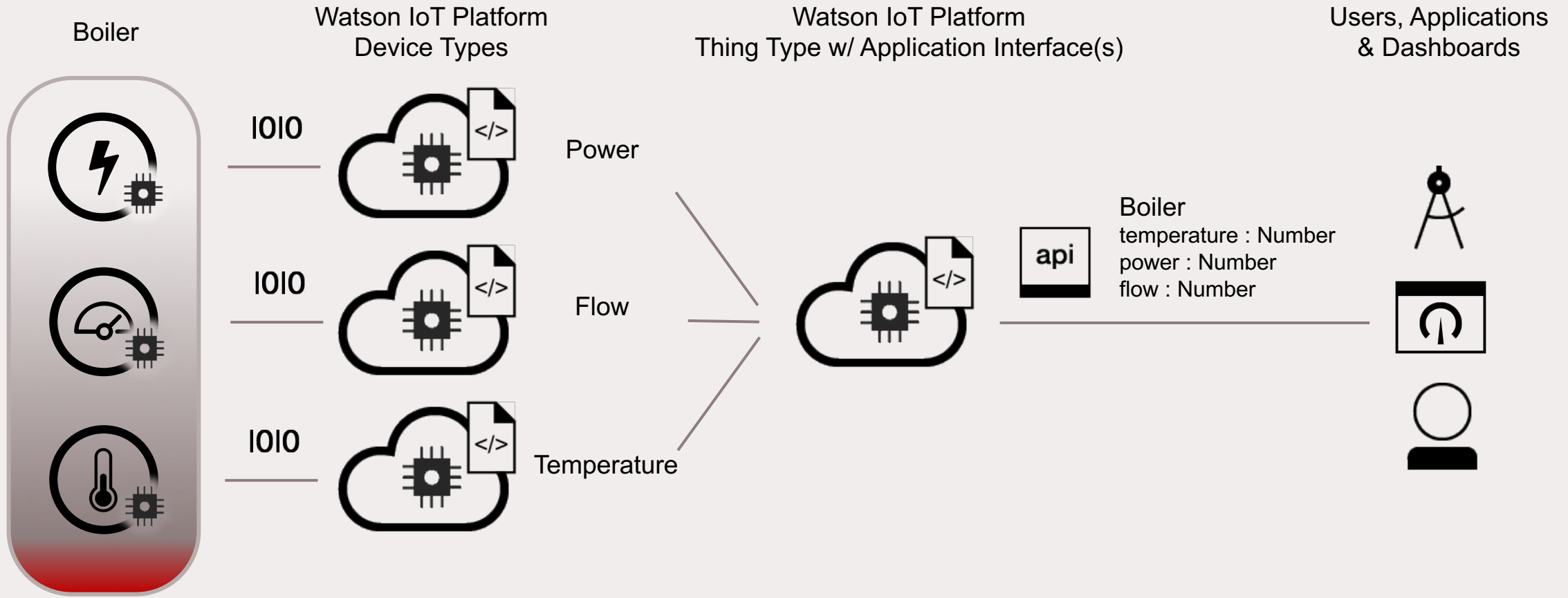
Multiple reusable abstract application interfaces to insulate applications from variability across device types, sensor models, variants and versions

Device Abstractions



Use abstract application interfaces to insulate applications from variability across device types, sensor models, variants and versions

Aggregation into Things



Aggregate multiple Devices into physical and logical Things
Normalize Things using abstract application interfaces

Manage assets without being exposed to the individual instrumentation of them

Discussion – Device Abstractions and Aggregation of Things

- Do you agree or disagree that Device Abstractions, Aggregation of Things and Processing of Events and State would help you solve your Information Management problems?
- What of your Information Management needs or requirements remains unsolved?



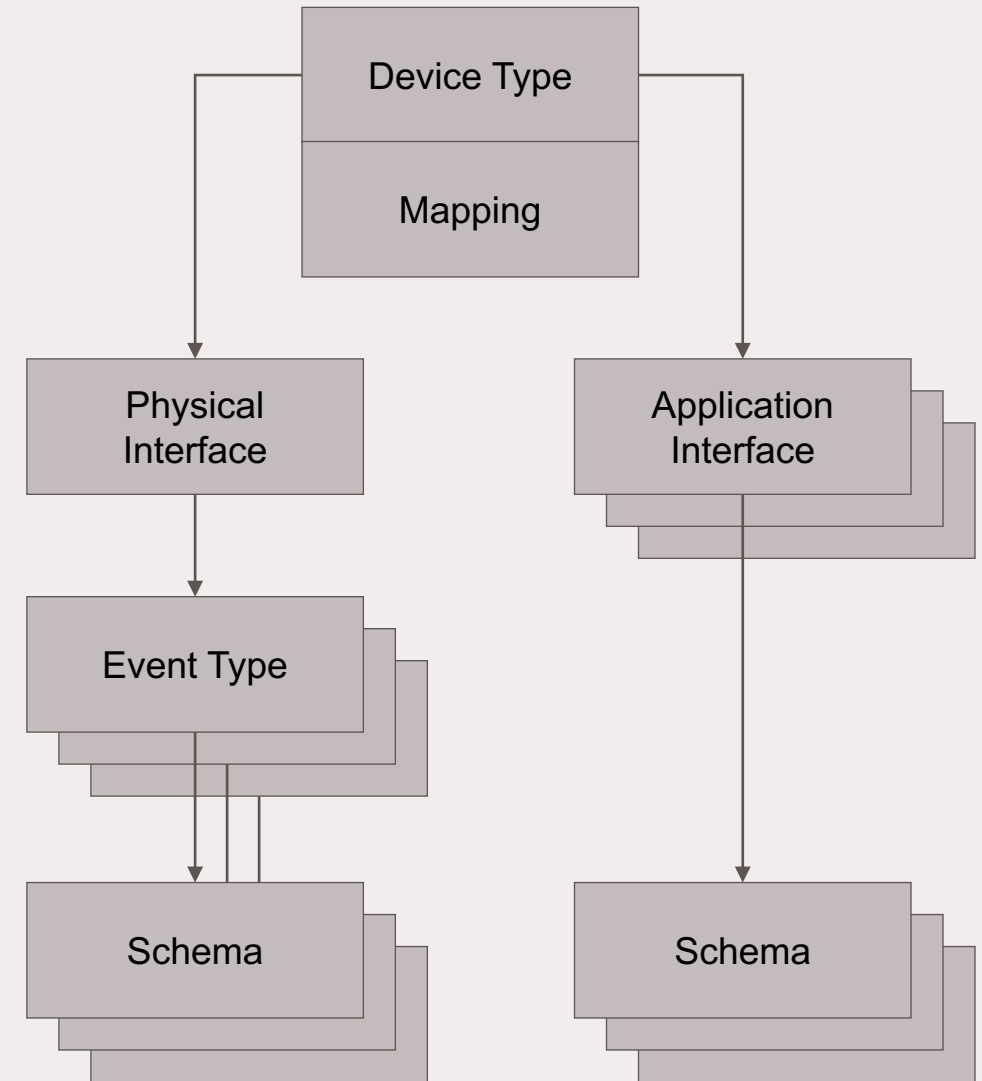
Use-Cases – Working with the Information Model

- The Watson IoT Platform supports initially two ways in working with the Information Model
 - Using the IoT Platform APIs to upload and deploy resources of the information model, provision instances of devices and things, and subscribe to state change events across the instances
 - Using the IoT Platform User Interface to create and manage the information model, create devices and things and view their state
- Would they use primarily one way to interact with the Information Model, or combinations of both?



Information Management Device Model Resources

- A **device type** is a template for registering devices of the same type
- A **physical interface** model the interface between the device and the IoT platform. State events and payload data is modeled in **schemas**
- An **application interface** is the exposed structure of properties, events and commands of a device
- The **mapping** connects properties of the interface to physical event payloads using expressions



Information Management HTTP REST API

The IoT Platform APIs supports

- Creating and uploading schema resources
- Validating and deploying resources
- Provisioning devices and things
- Discovering the information model
- State change events
- Calculation on real-time data
- Error events from processing pipeline

For API details, see

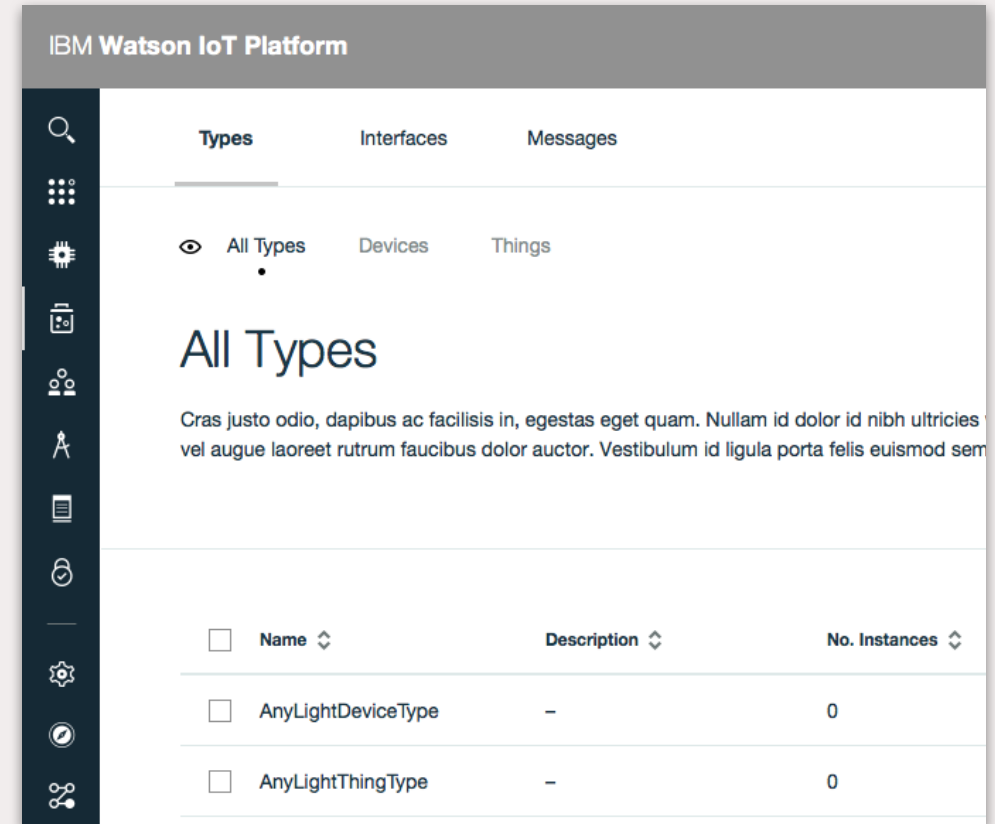
https://console.ng.bluemix.net/docs/services/IoT/information_management/im_index.html

```
{
  "typeId": "roomType",
  "thingId": "kitchen",
  "name": "Kitchen",
  "description": "The Kitchen",
  "aggregatedObjects": {
    "temperatureSensor": {
      "type": "device",
      "typeId": "TempSensor",
      "id": "myTempSensor123"
    },
    "humiditySensor": {
      "type": "device",
      "typeId": "HumiditySensor",
      "id": "myHumSensor456"
    },
    "lightBulb": {
      "type": "device",
      "typeId": "LightBulb",
      "id": "myLightBulb789"
    }
  },
  "created": "2016-09-16T13:59:22Z",
  "createdBy": "john.doe@us.ibm.com",
  "updated": "2016-09-16T15:26:12Z",
  "updatedBy": "fred.bloggs@uk.ibm.com",
  "metadata": {
    "customField1": "customValue1",
    "customField2": "customValue2"
  }
}
```

Information Management IoT Platform User Interface

Additions in the IoT Platform User Interface provides tools to overview and manage the information model

- A simple to use editor to add a new device type with an interface by selecting events received from the device
- Editors for advanced users to create device and thing types and form a consistent information model by adding and reusing interfaces and schemas
- A library of all information model resources to manage changes, dependencies, validity, deployments and versions.



Summary and Conclusions

Learn more about Watson IoT Platform

- Are you visiting the Watson IoT Platform Blog to receive notifications on platform updates?
<https://developer.ibm.com/iotplatform/blog/>
- Are you enabling Experimental Features to try new platform capabilities?
- Are you participating in the IoT Platform beta programs?



Learn more about Watson IoT Platform

Learn more about IBM's point of view on the
Internet of Things

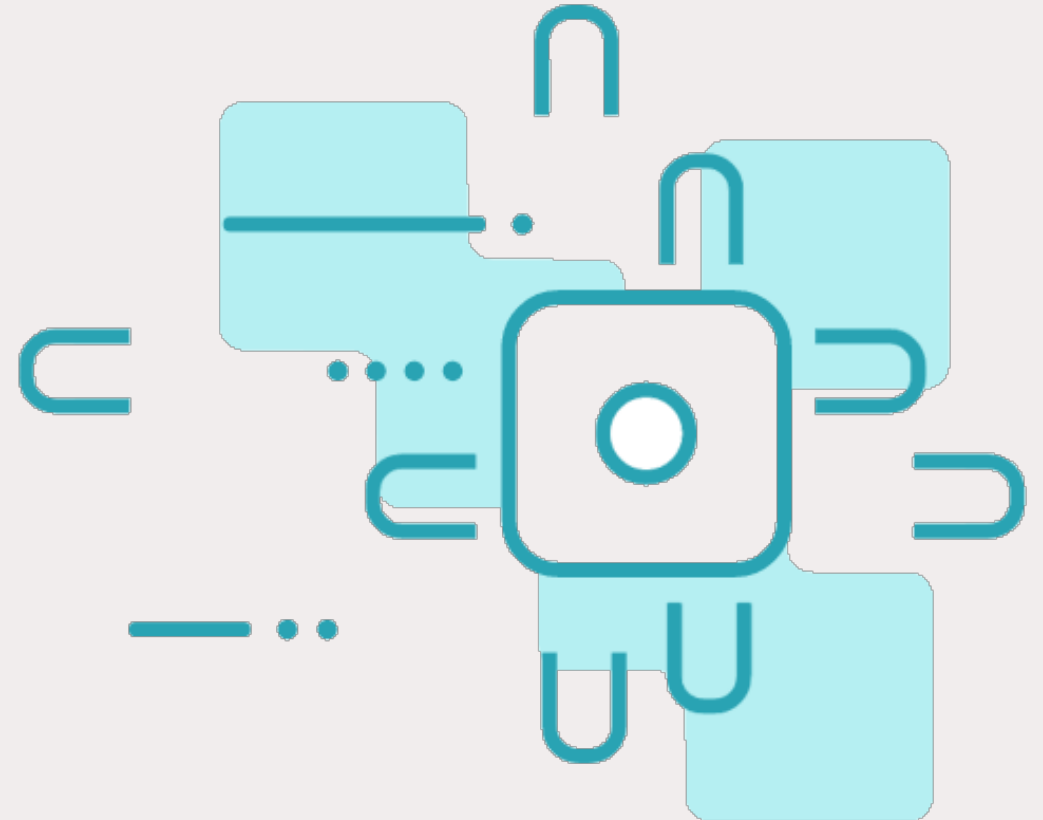
ibm.com/loT

Try out our Internet of Things platform

ibm.biz/try_iot
Bluemix.net

Join us in our IoT conversations

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Learn more about Information Management

Watson IoT Docs

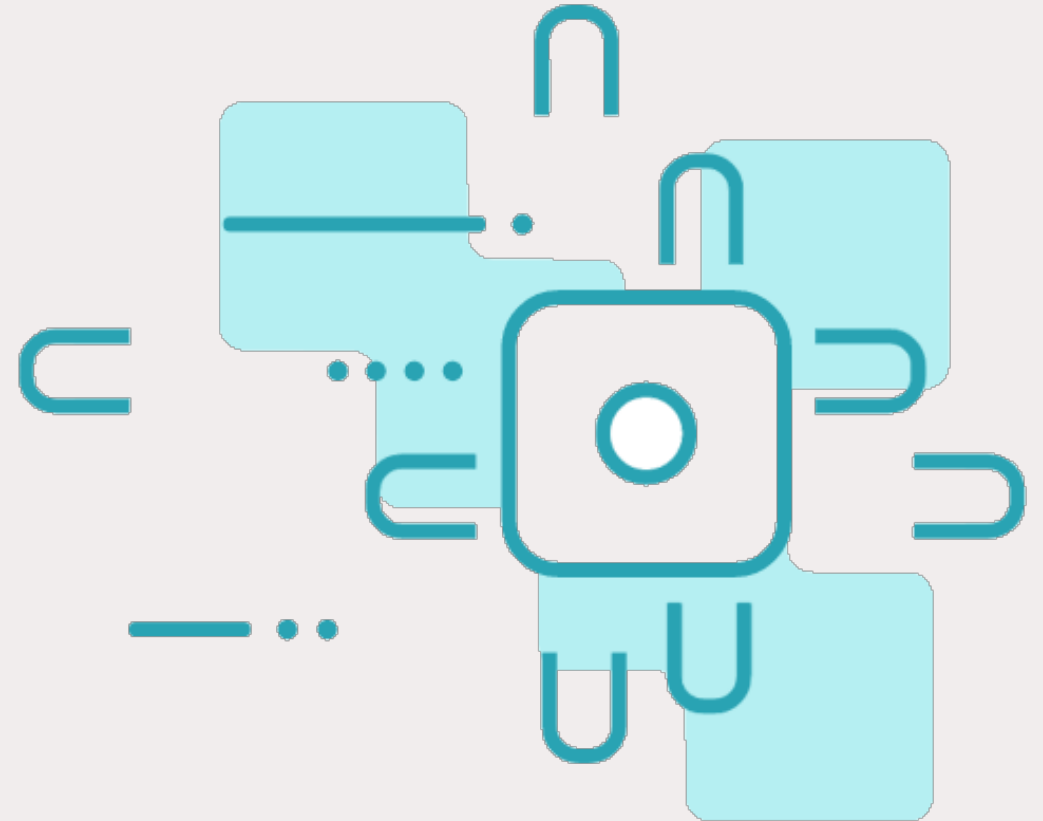
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The members of the DPP are meeting monthly with IoT Platform offering management, design and development to learn about new IoT Platform capabilities in the roadmap and to provide their feedback and guidance on priorities.

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