Watson IoT Platform

Watson IoT™

Bernard Kufluk – IoT Connectivity Offering Manager

October 2017

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Watson IoT

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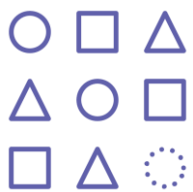
Watson IoT

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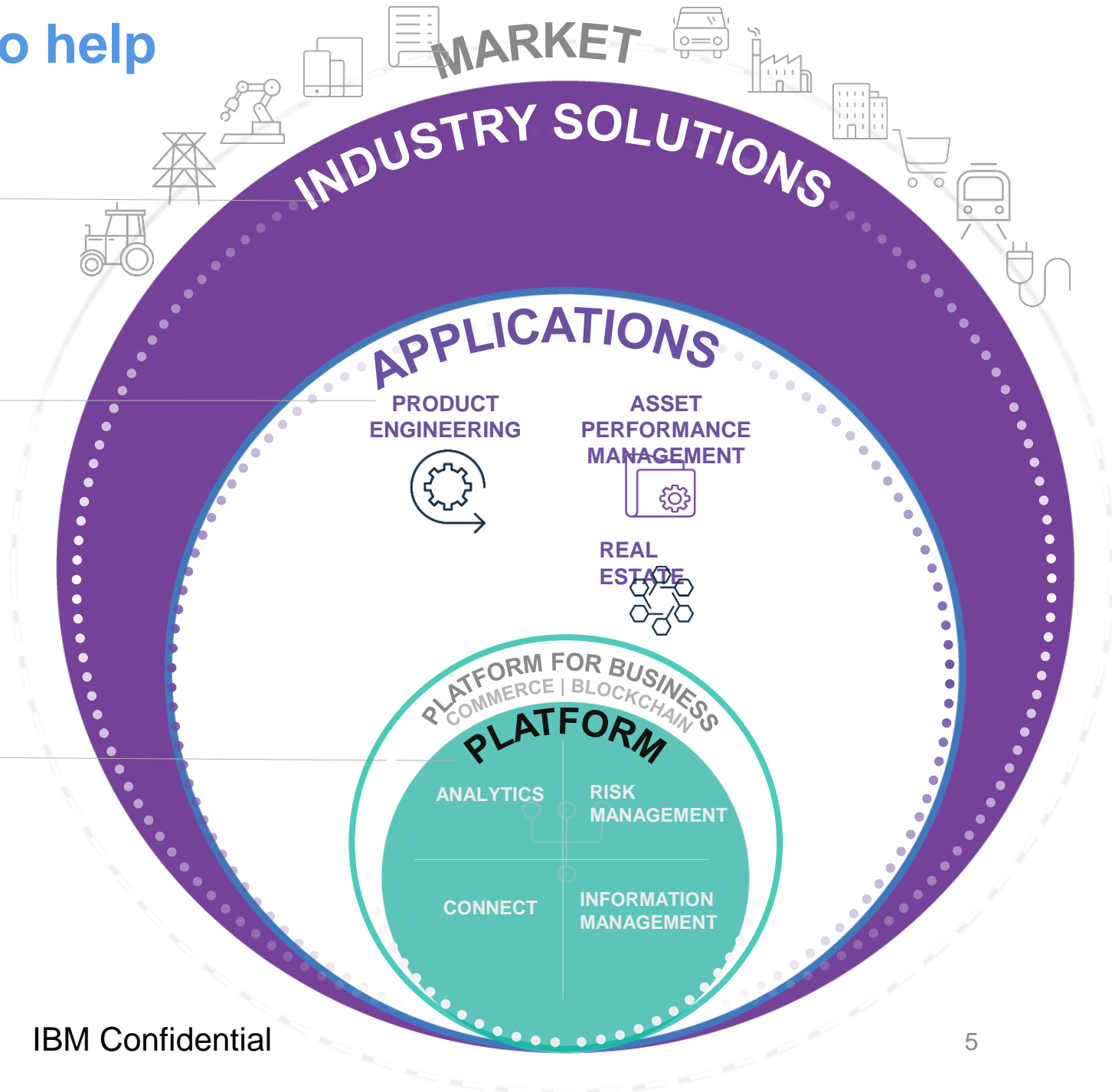
Watson IoT has the solutions to help

TRANSFORM. *Pre-packaged solutions to grow your business with new services and business models.*

SOLVE. *Applications to improve business outcomes through connected operations and connected products.*
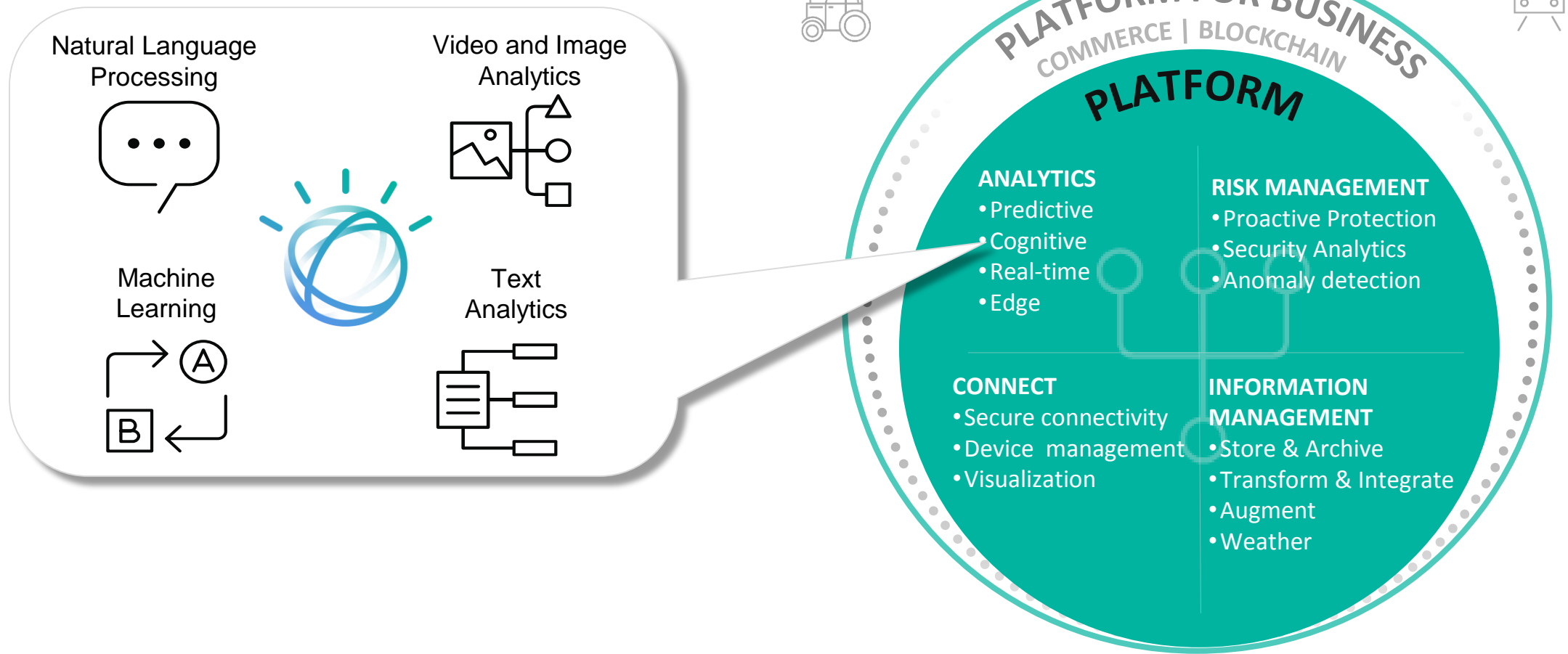
BUILD. *The tools you need to create, modify, connect, manage, analyze, and secure IoT devices and data.*

MARKET

INDUSTRY SOLUTIONS

APPLICATIONS

PRODUCT ENGINEERING

ASSET PERFORMANCE MANAGEMENT

REAL ESTATE

PLATFORM FOR BUSINESS
COMMERCE | BLOCKCHAIN

PLATFORM

ANALYTICS

RISK MANAGEMENT

CONNECT

INFORMATION MANAGEMENT
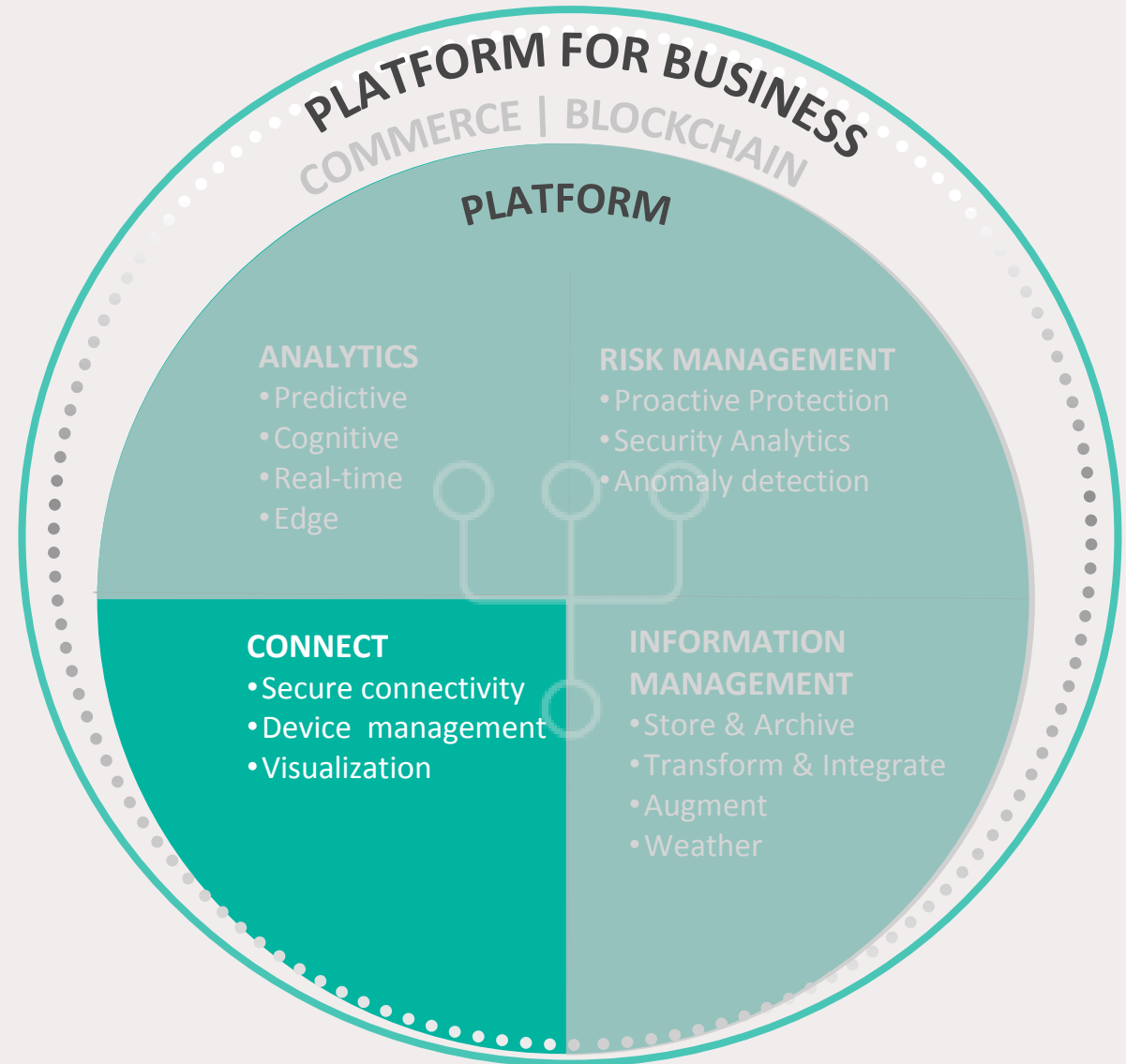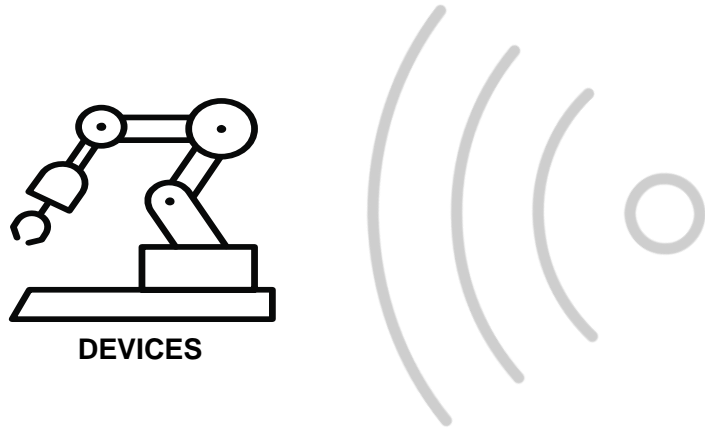
Transform   Solve   Build

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IBM Watson IoT Platform

Make sense of data to optimize operations, manage assets, rethink products and services, and transform customer experience.
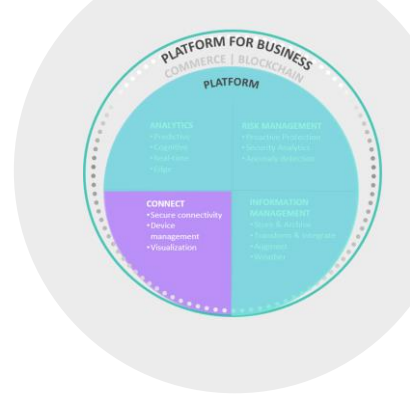
Natural Language Processing

Video and Image Analytics

Machine Learning

Text Analytics

PLATFORM FOR BUSINESS
COMMERCE | BLOCKCHAIN

PLATFORM

ANALYTICS
- Predictive
- Cognitive
- Real-time
- Edge

RISK MANAGEMENT
- Proactive Protection
- Security Analytics
- Anomaly detection

CONNECT
- Secure connectivity
- Device management
- Visualization

INFORMATION MANAGEMENT
- Store & Archive
- Transform & Integrate
- Augment
- Weather

IBM Watson IoT Platform Connect

Connect your devices, equipment, and workforce to gain a new level of insight into your business

DEVICES

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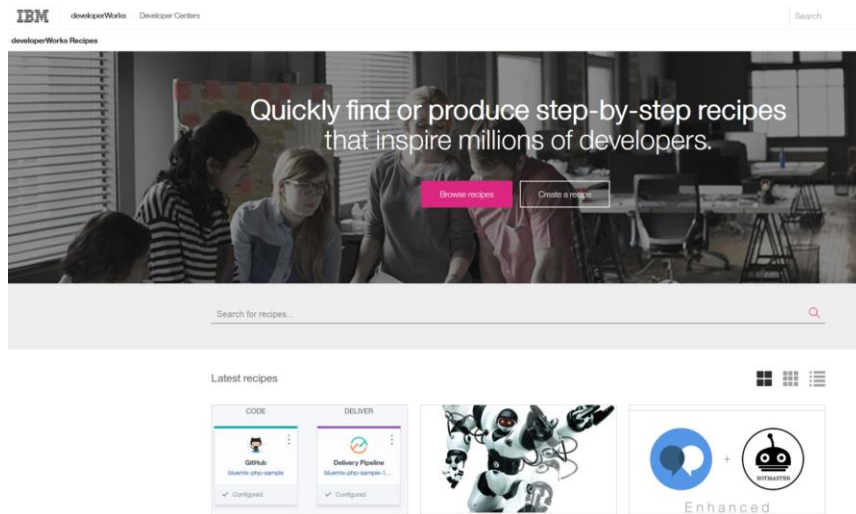- Weather

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IBM Watson IoT Platform - Connect
## Connect what matters with the Hub for IoT devices

Connect and manage your IoT Devices & Gateways

- Open standards based communications (MQTT, HTTPS)
- Secure communication (TLS)
- Globally scalable starting with a single device
- Fully integrated Gateway support
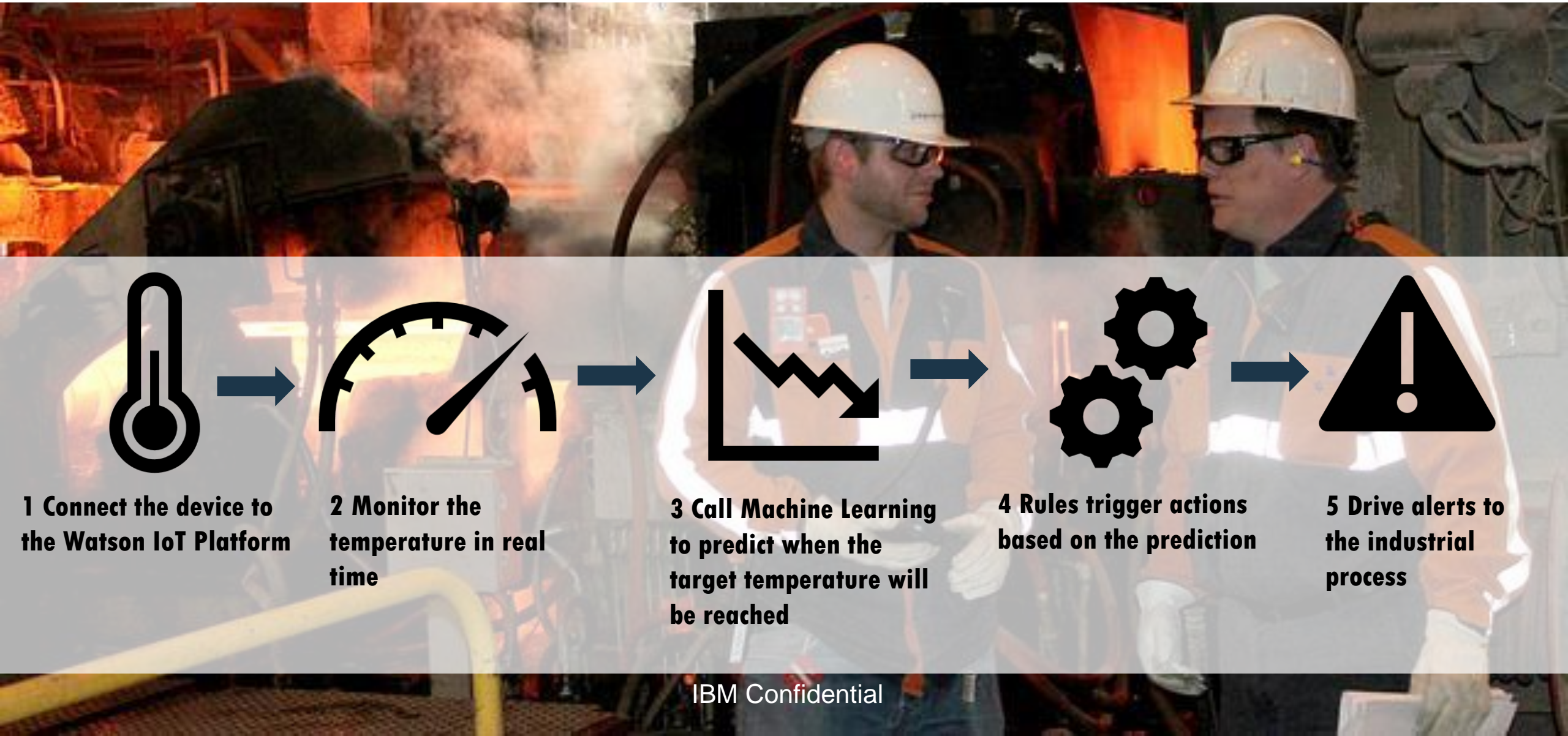- Broad and growing device ecosystem

Integrated device management

- From dashboard or programmatic APIs
- Action device management functions on thousands of devices at a time
- Create your own custom device management commands

Factory Reset

Location Update

Reboot

Firmware Download

Firmware Update
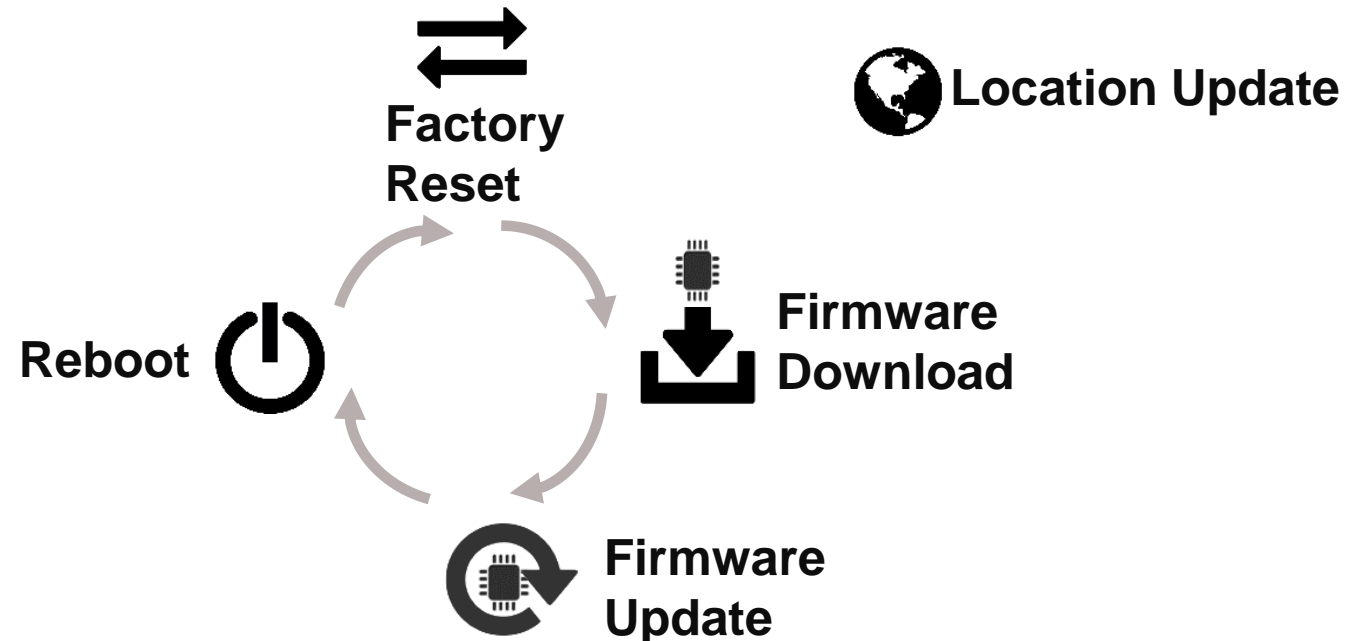
DEMO: Watson IoT working with machine learning

The prediction of the temperature of a process is fundamental for many industrial processes

1 Connect the device to the Watson IoT Platform

2 Monitor the temperature in real time

3 Call Machine Learning to predict when the target temperature will be reached

4 Rules trigger actions based on the prediction

5 Drive alerts to the industrial process

**1 Connect the device to
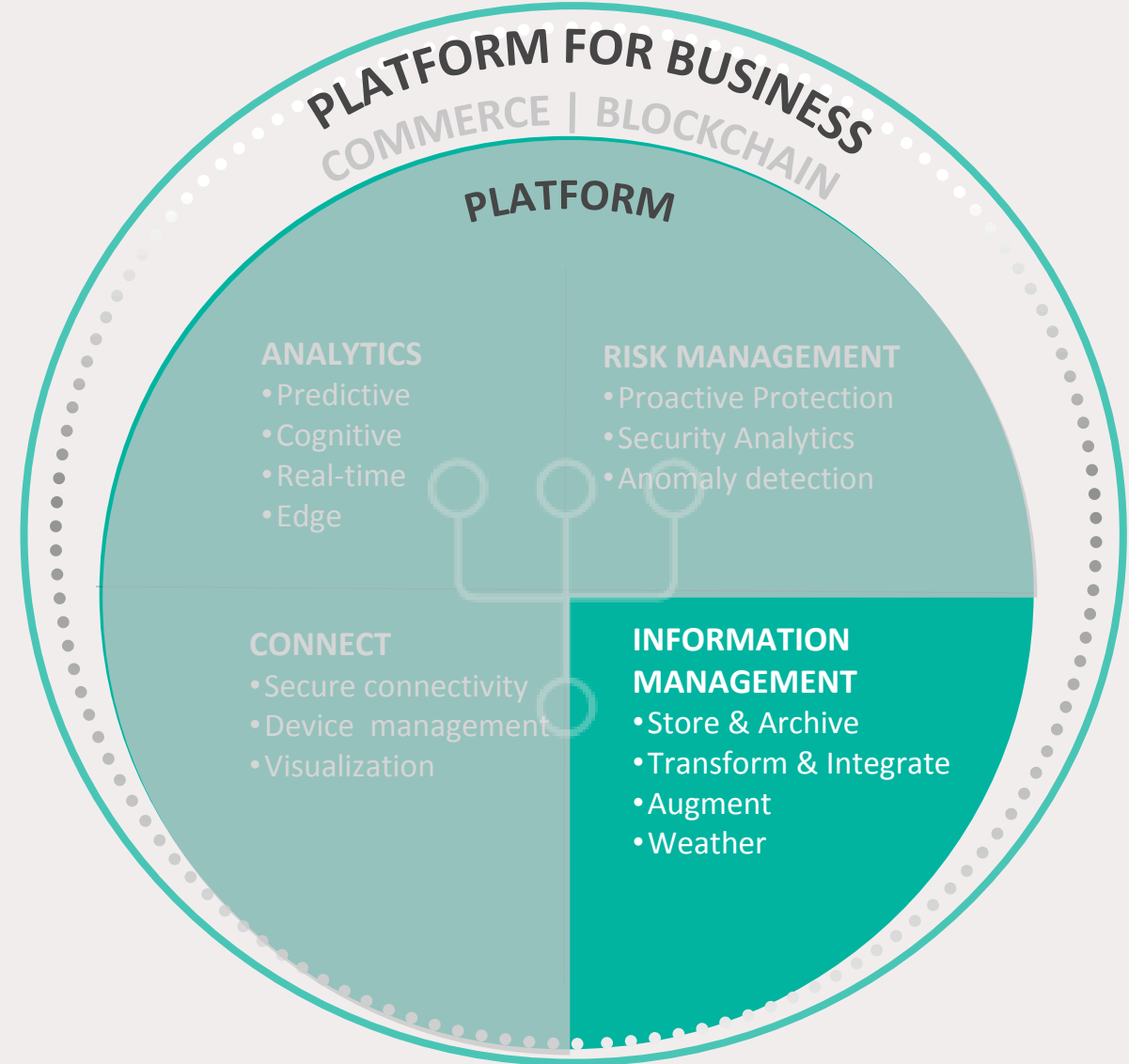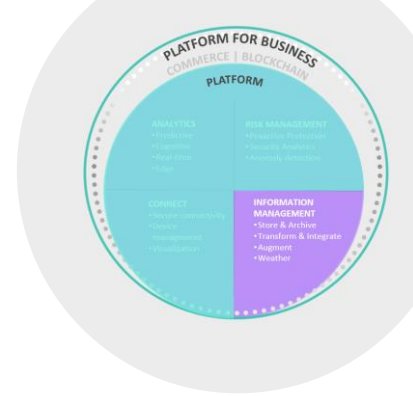the Watson IoT Platform**

2 Monitor the temperature in real time

IBM Watson IoT Platform Information Management

Identify, aggregate, and transform data from your IoT sources into asset-based data structures.


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- ## Built in last event cache
  Always have access to the last reading whether device is on or offline

- ## Fully managed NoSQL JSON document store built for high integrity and high performance

IBM **Cloudant**®

- ## Integration with IBM MessageHub
  Internet scale buffering between the IoT Platform and your chosen storage service
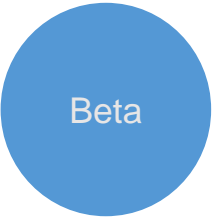 Use as a bridge to other Bluemix services, such as IBM Object Store

IBM **Message Hub**®

Built on Apache
kafka

Information Management
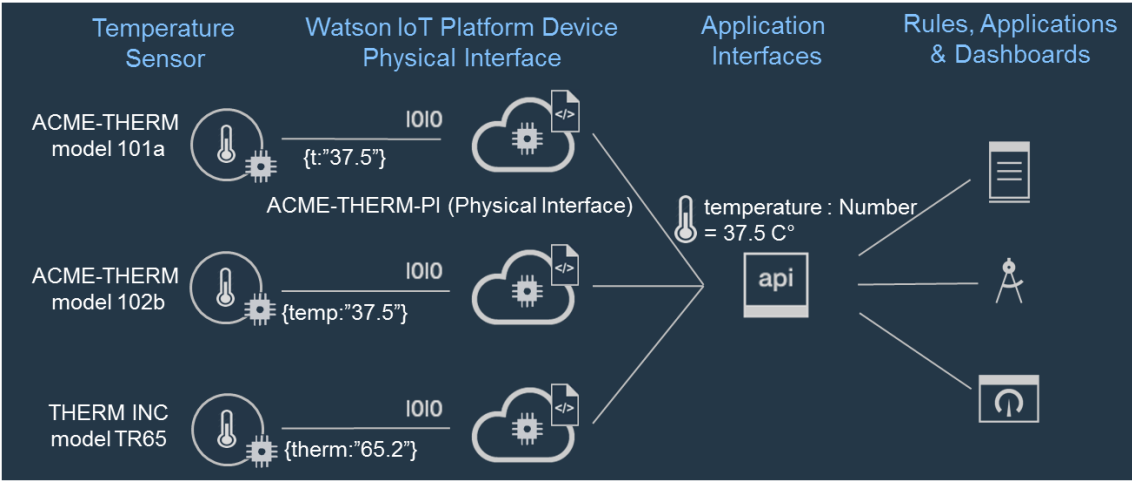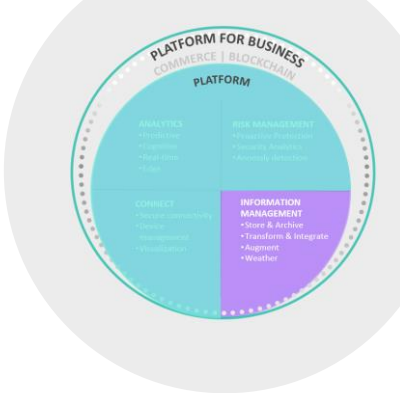
Device Abstraction

Beta
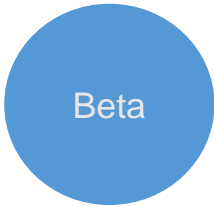
Define your own APIs to insulate applications from variability across device types, sensor models, variants and versions
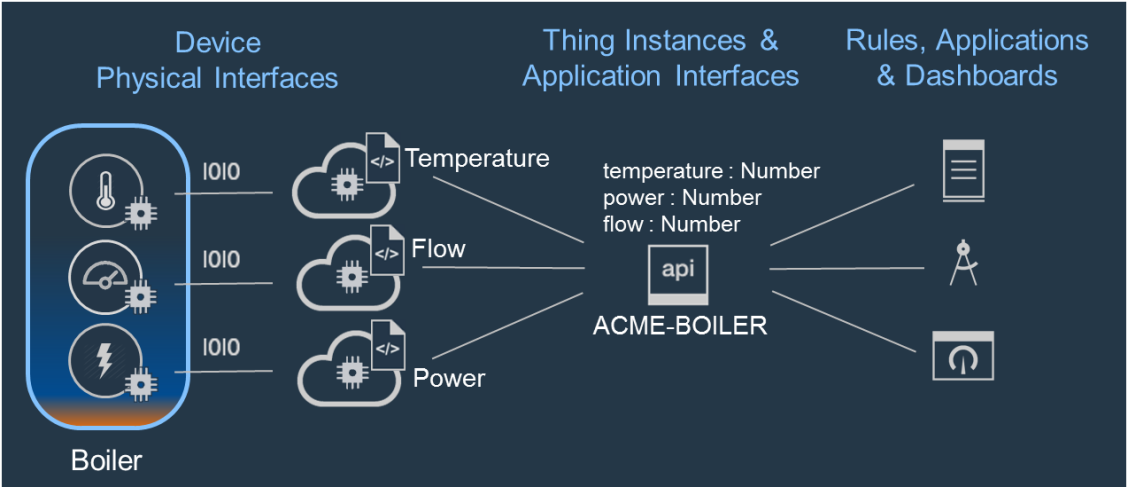
Example: Different models and brands of temperature sensor represented by a single common API

Temperature Sensor	Watson IoT Platform Device Physical Interface	Application Interfaces	Rules, Applications & Dashboards

ACME-THERM model 101a — IOIO {t:"37.5"}

ACME-THERM-PI (Physical Interface)

ACME-THERM model 102b — IOIO {temp:"37.5"}

THERM INC model TR65 — IOIO {therm:"65.2"}

temperature : Number = 37.5 C°

api
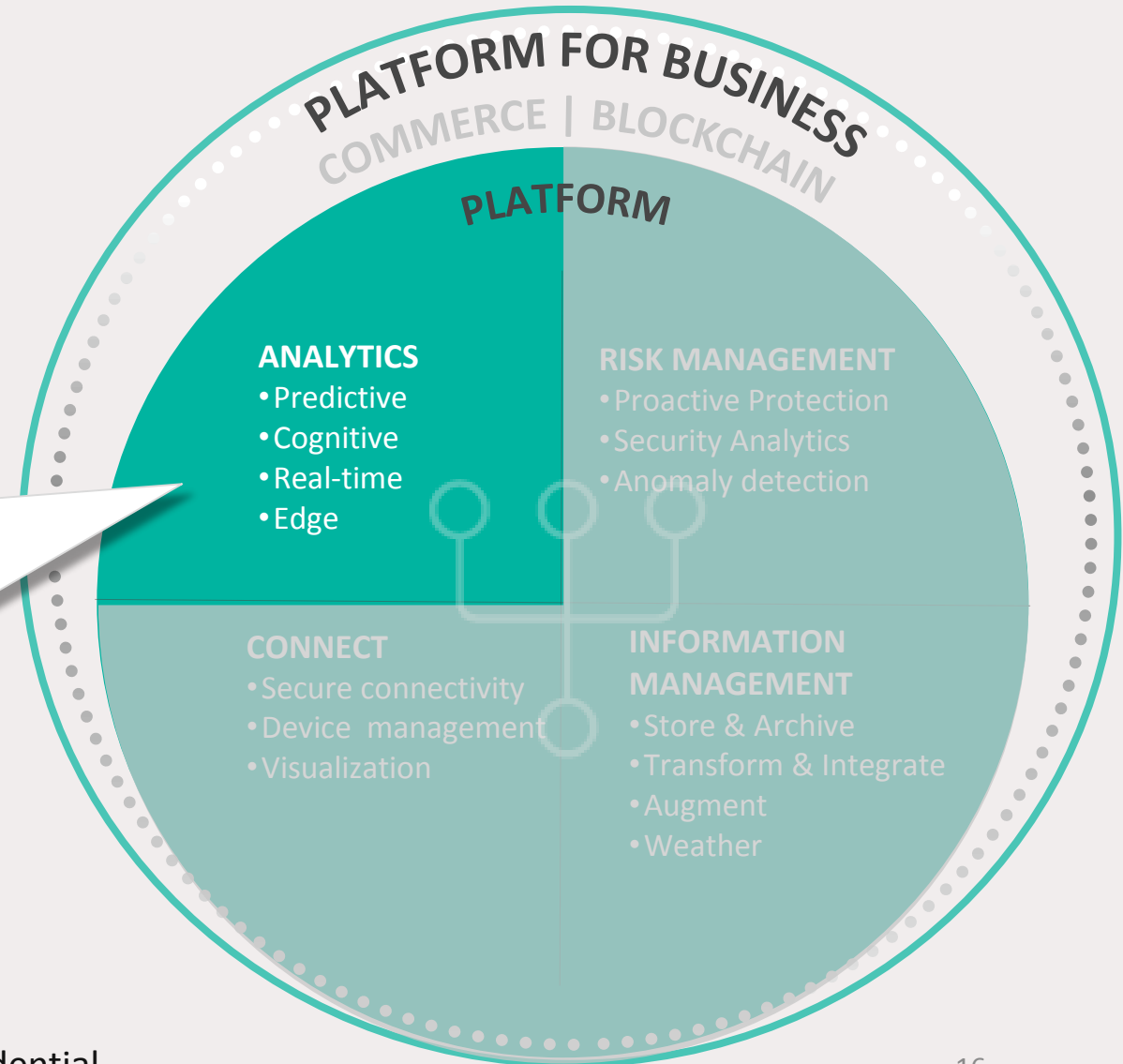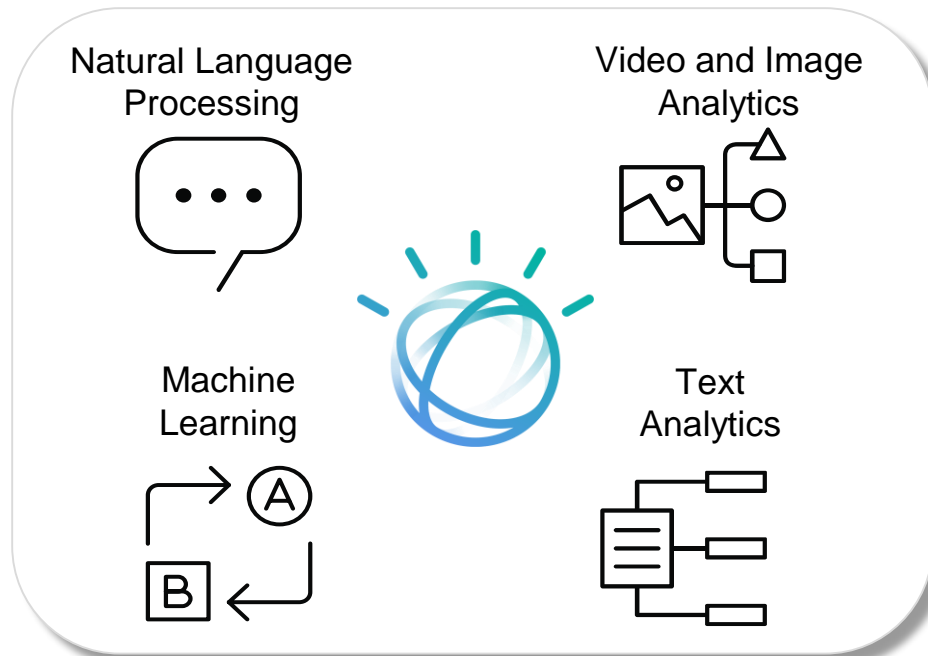
Aggregation into Things

Beta

Aggregate multiple devices into logical objects so they can be managed as a single Thing

Example: Several different sensors represented as a single boiler object

Device Physical Interfaces	Thing Instances & Application Interfaces	Rules, Applications & Dashboards

IOIO — Temperature

IOIO — Flow

IOIO — Power

Boiler

temperature : Number
power : Number
flow : Number

api

ACME-BOILER

IBM Watson IoT Platform Analytics

Leverage a host of cutting edge cognitive tools to gain a deeper understanding of your structured and unstructured data.

Natural Language Processing

Video and Image Analytics

Machine Learning

Text Analytics

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IBM Watson IoT Platform - Analytics

Real-time Analytics

- Rules and action oriented analytics, built in to the platform
- Business user oriented interface
- Drive automation to take appropriate, prescribed actions

Edge Analytics

- Single click deploy of rules from cloud to Edge
- New openSDK extending gateway choice

Predictive

- Integrate with IBM PMQ (predictive maintenance and quality) and Watson Machine Learning services
- Forecast usage and operating conditions based on environmental conditions
- Gain insights from devices in context; adjusting designs and manufacturing processes
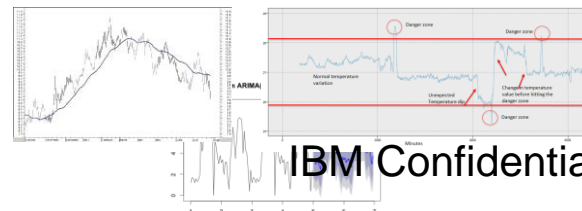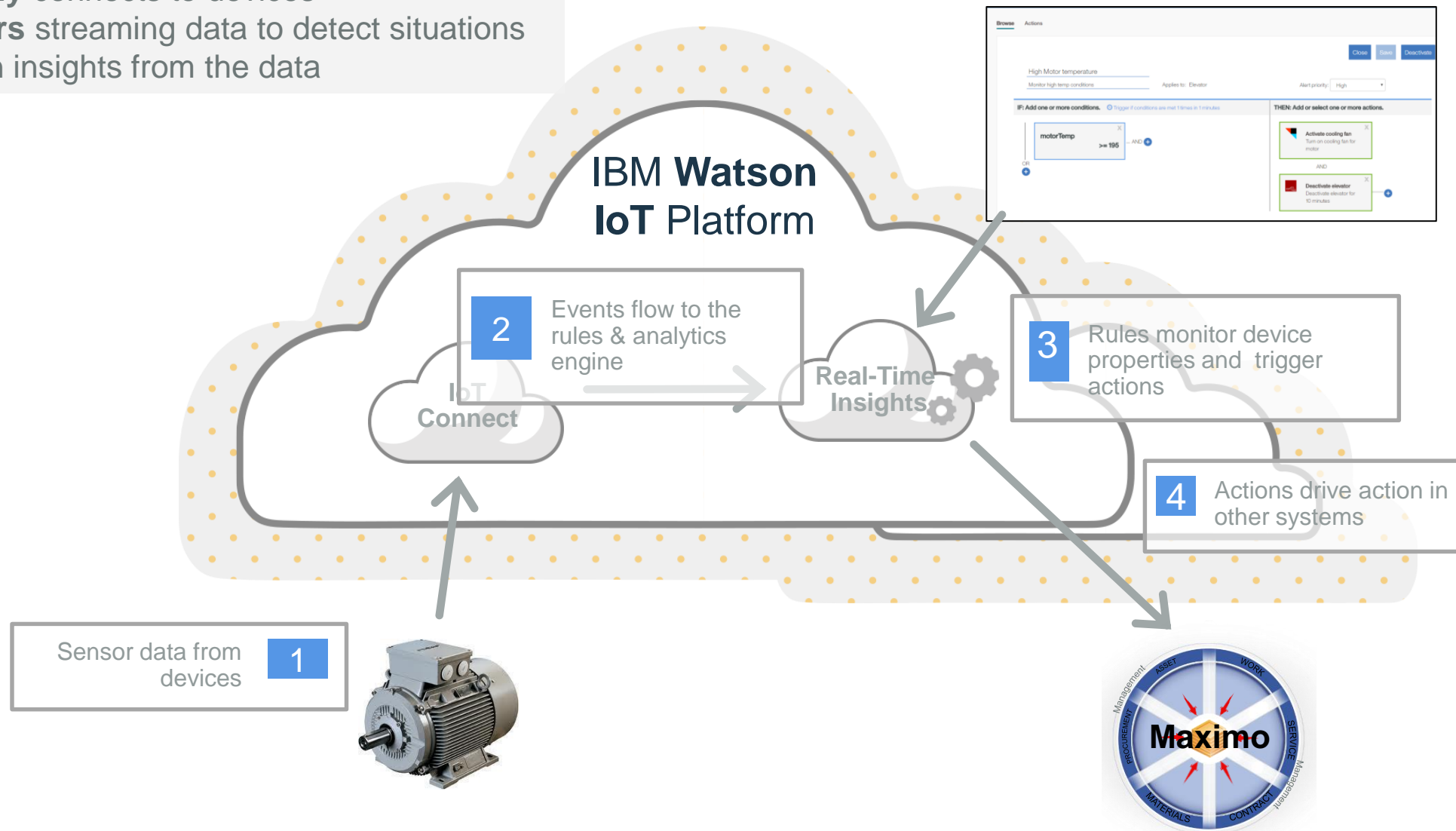
Cognitive

- Watson API families allow easy integration of cognitive analytics into IoT apps
- interact naturally with humans, learn from historical data, analyze image and textual data sources to enrich analytics & insights

Natural Language Processing

Video and Image Analytics

Machine Learning

Text Analytics
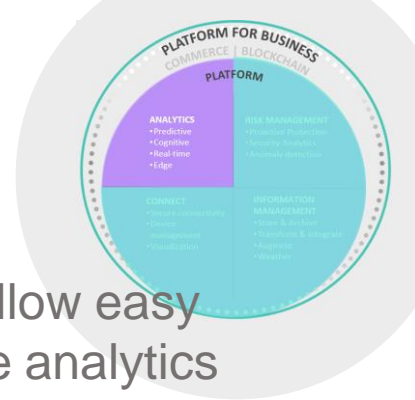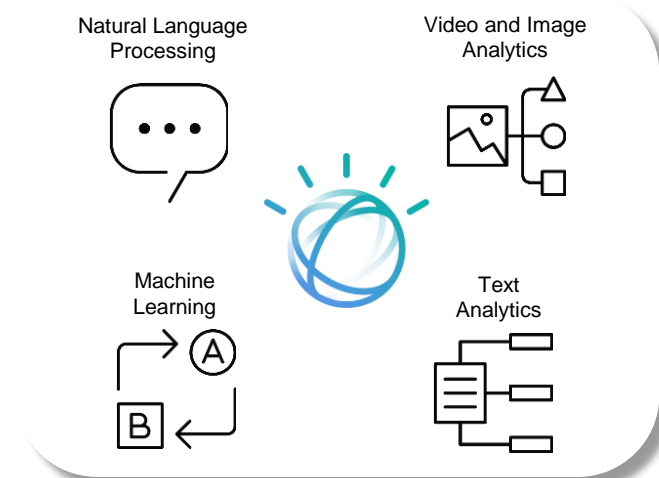
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Watson IoT Platform Real-Time Insights

- **Securely** connects to devices
- **Monitors** streaming data to detect situations
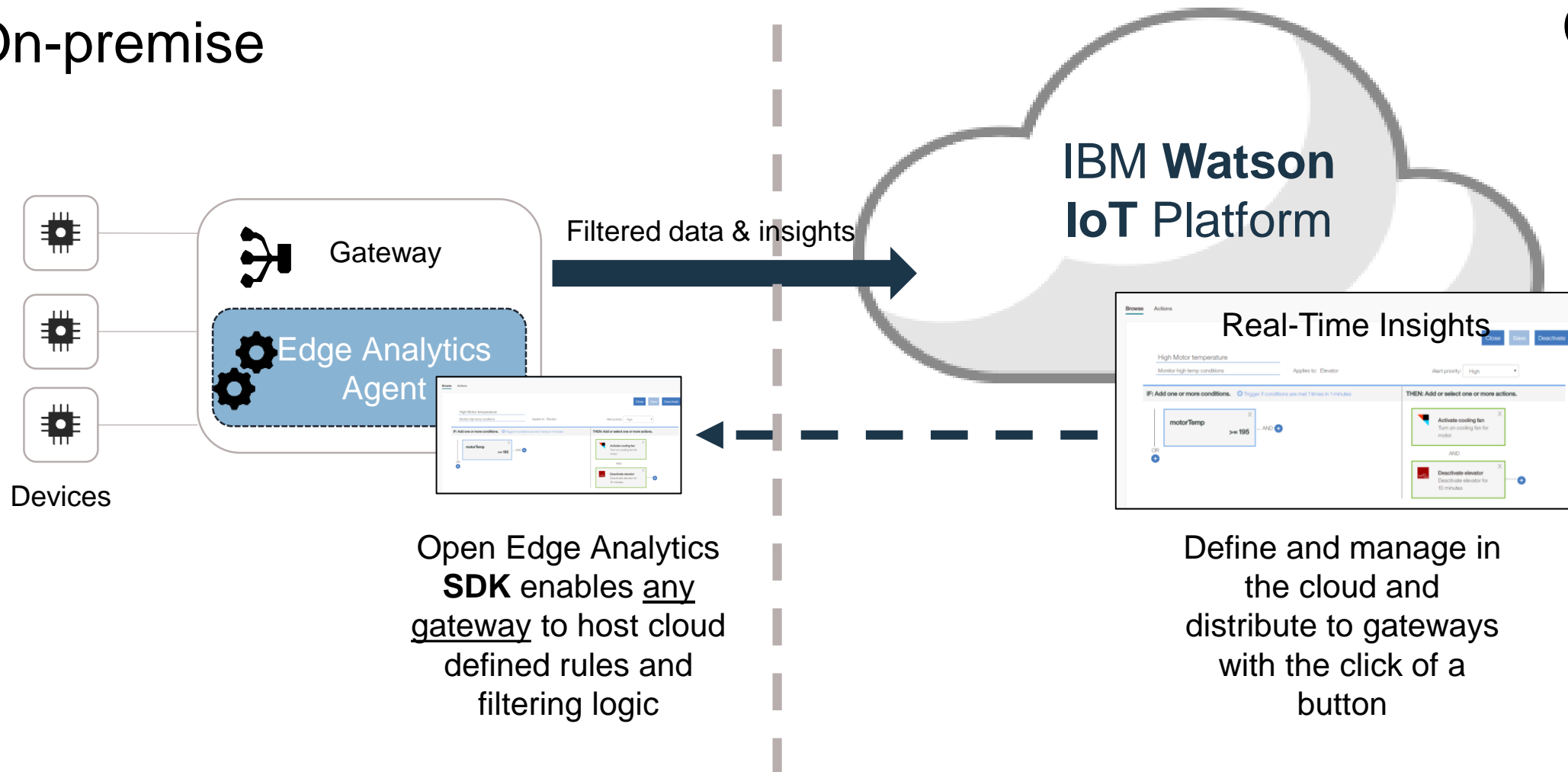- **Acts** on insights from the data

IBM **Watson IoT** Platform

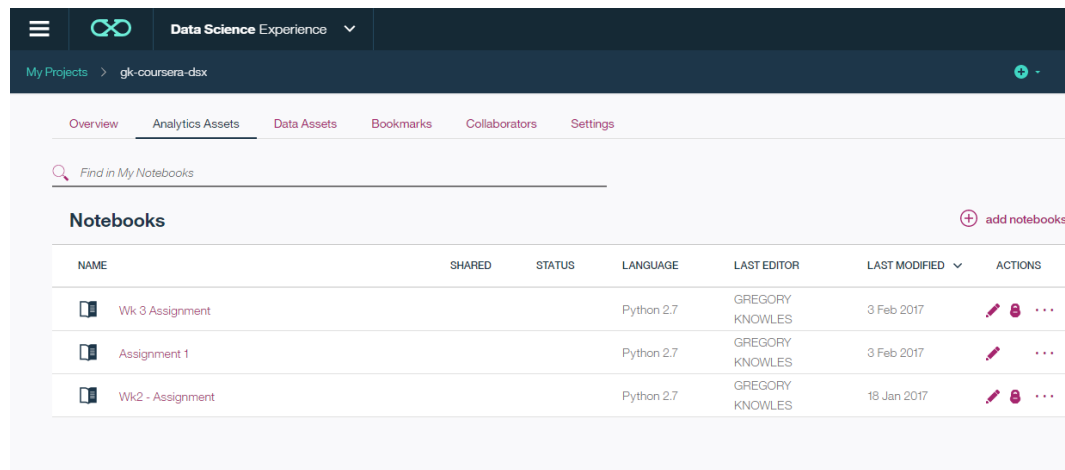**2** Events flow to the rules & analytics engine

3 Rules monitor device properties and trigger actions

4 Actions drive action in other systems

IoT Connect

Real-Time Insights

Sensor data from devices **1**

Maximo

Real-Time

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Edge Analytics reduce data feeds, make local decisions, work disconnected

On-premise

Devices

Gateway

Edge Analytics Agent

Filtered data & insights

Cloud

IBM **Watson IoT** Platform

Real-Time Insights

Open Edge Analytics **SDK** enables <u>any</u> <u>gateway</u> to host cloud defined rules and filtering logic

Define and manage in the cloud and distribute to gateways with the click of a button

- **Extend analytics and actions with data science tools, machine learning and scalable, serverless models**

Data Science Experience & Machine Learning

NEW
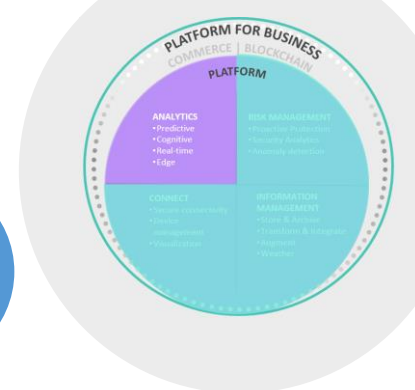
Wizards guide you through the process of creating machine learning (ML) models from IoT data without having to learn complex tools and ML algorithms.

Powered by IBM Data Science Experience and Watson Machine Learning.

NEW

Extensible, scalable event handling with OpenWhisk actions

The scalable, event driven micro services that run in the server-less environment of OpenWhisk work seamlessly with Watson IoT Platform Real-Time Insights

Leverages OpenWhisk as the action engine for defining reusable actions in a variety of languages
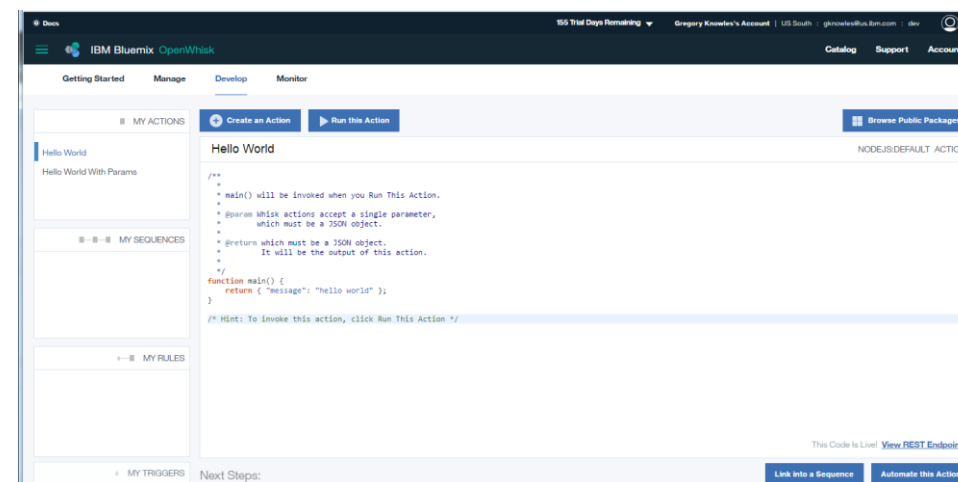
IBM Watson IoT Platform Risk Management

Manage risk and gather insights across your entire IoT landscape.

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Risk Management

| Security assessment | Data anonymization | Threat intelligence | ➕ | PROFESSIONAL SERVICES |

| Security dashboard | Policy management | ➕ | ADVANCED PLATFORM CAPABILITIES |

| Security by design | ✔ | INCLUDED IN BASE WATSON IOT PLATFORM |
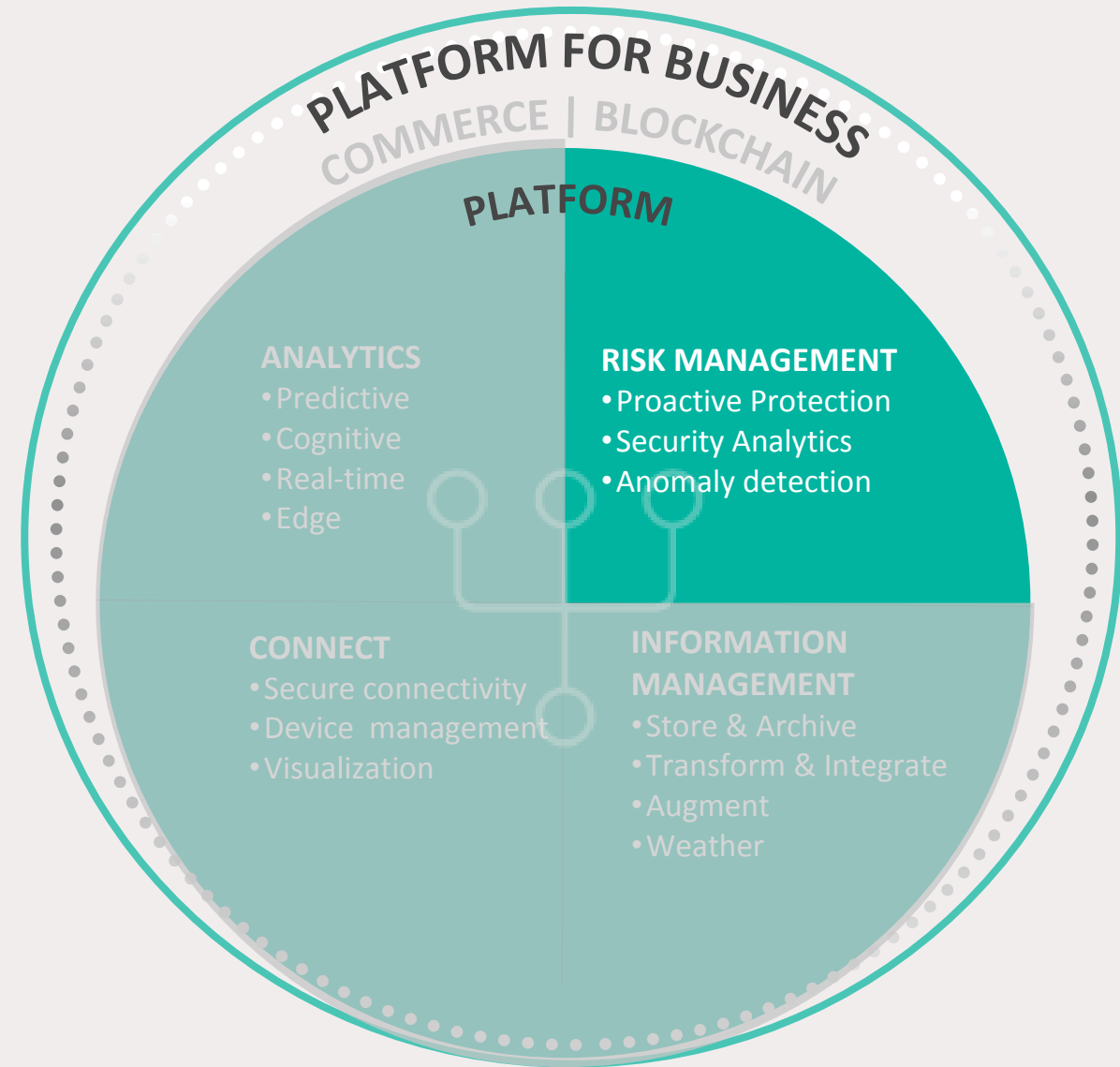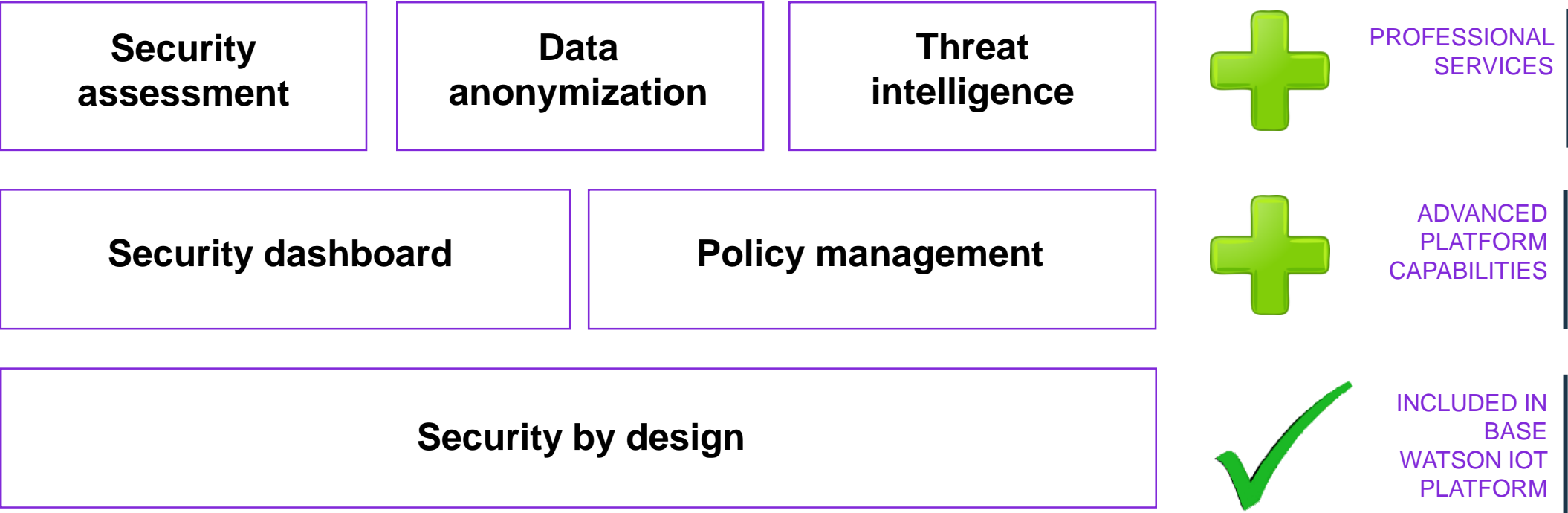
Risk Management & Policy Dashboard
Your single perspective on IoT risk exposure
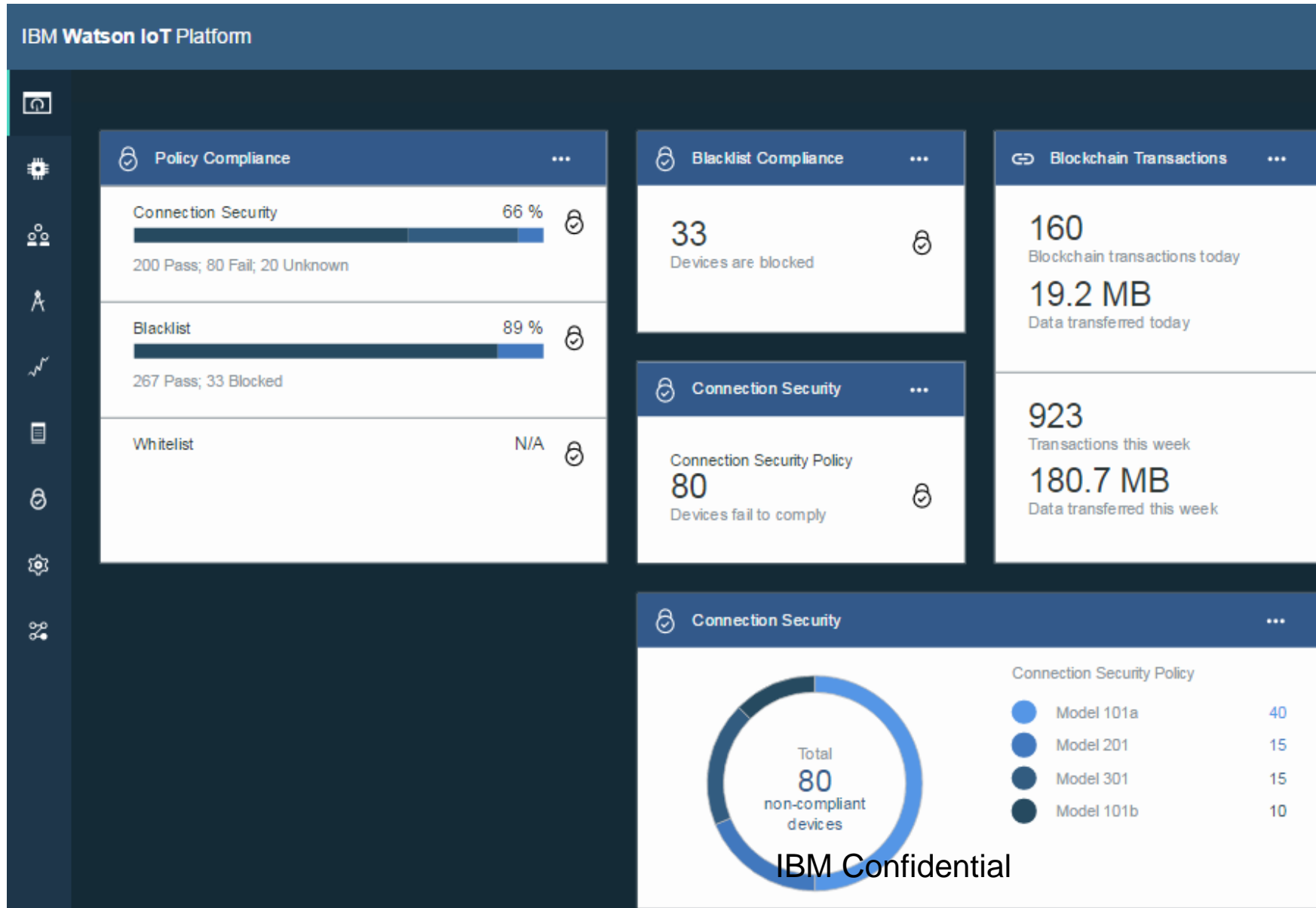
- Implement and accumulate reusable checks to identify device compromise and malicious events
- Protect against threats to the IoT environment with **blacklists**, **whitelists** and device behaviour **thresholds**
- Maintain platform **resilience** by acting on alerts automatically

Watson IoT Platform powers the first commercial drones featuring cognitive computing capabilities

By putting Watson IoT capabilities into flight, Aerialtronics can help companies open up expansive number of possibilities to gain insight in places not easily accessible to humans. Possible scenarios include helping organizations across multiple industries, from monitoring city traffic patterns to inspecting wind turbines, oil rigs and cell tower optimization.

3 Call Machine Learning to predict when the target temperature will be reached

4 Rules trigger actions based on the prediction

5 Drive alerts to the industrial process

Flow through the platform

Device
Washing Machine

TLS
Client Certificate

Edge
Rules

Gateway

MQTT
HTTP

3G
2G
Wifi
LPWAN

Device
Washing Machine

Device v2
Washing Machine

Bluemix

Watson IoT Platform

APIs

Device
Registry

Rules

Data normalisation
and transformation

Last Event Cache
Device State

Dashboards

User
Registry

Advanced
Security

Security Dashboard   Security Policy

Public
London, Dallas, China

Dedicated
32 Datacenters

APIs

IFFT
Email
Node Red
Web Hook

Application
HTTP / MQTT

Admin
HTTP

Historical
data store

Archive

Cloudant
MessageHub (Kafka)

OpenID
SSO

External User
Registry

Other services

Analytics
API Management

Node-RED

Applications

Deployment options & Geography choices

Watson IoT Platform is available in two deployment options
1. Public cloud (multi-tenant)
2. Dedicated cloud (isolated single tenant)

Globally to all our users across 175 countries, including China

Customers can order a Dedicated version of the Platform in any of our 46 IBM Cloud (SoftLayer) data centers located around the world

We can address the geo privacy rules & regulatory compliance as required

Developer Ecosystem

- New pages on ibm.com/iot for developers and technology partners
  http://www.ibm.com/internet-of-things/roles/iot-developer/
  http://www.ibm.com/internet-of-things/partners/find-a-partner/
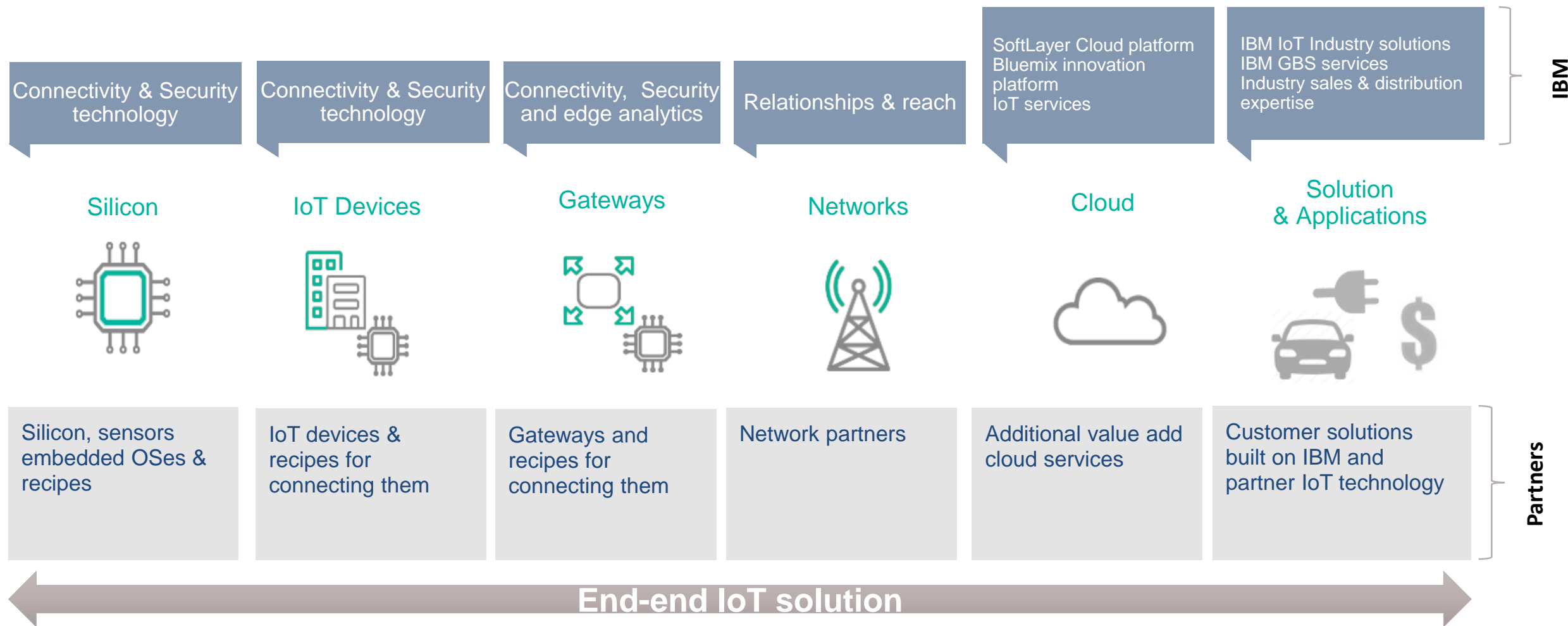
- Two IoT Courses on Coursera

- New Platform "Lite" plan – freemium in perpetuity
  - 200 MB exchanged
  - 200 MB analysed/mth
  - 500 devices

NEW

NEW

The IoT Value Chain

Connectivity & Security technology	Connectivity & Security technology	Connectivity, Security and edge analytics	Relationships & reach	SoftLayer Cloud platform Bluemix innovation platform IoT services	IBM IoT Industry solutions IBM GBS services Industry sales & distribution expertise
Silicon	**IoT Devices**	**Gateways**	**Networks**	**Cloud**	**Solution & Applications**
Silicon, sensors embedded OSes & recipes	IoT devices & recipes for connecting them	Gateways and recipes for connecting them	Network partners	Additional value add cloud services	Customer solutions built on IBM and partner IoT technology

End-end IoT solution

10/30/2017

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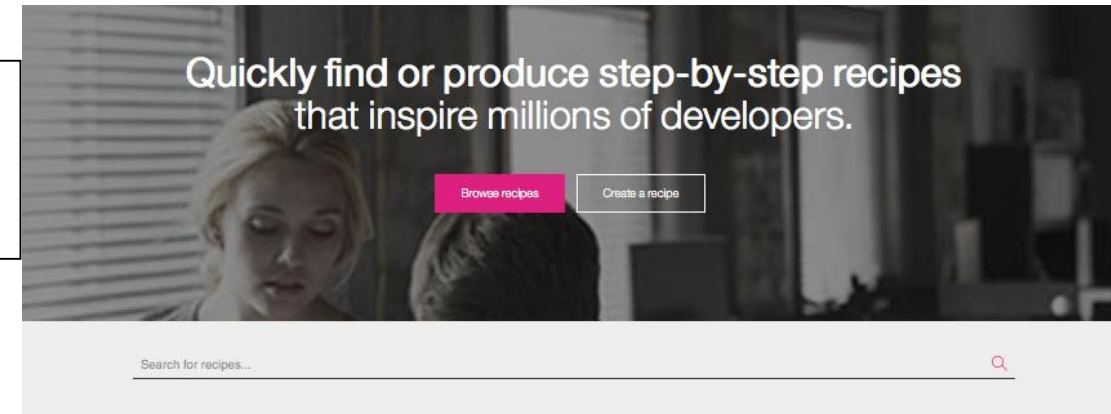
Open ecosystem & partnership strategy extend IBM Watson IoT platform

Derive IoT value on the Cloud through strong industry partnerships and open ecosystem
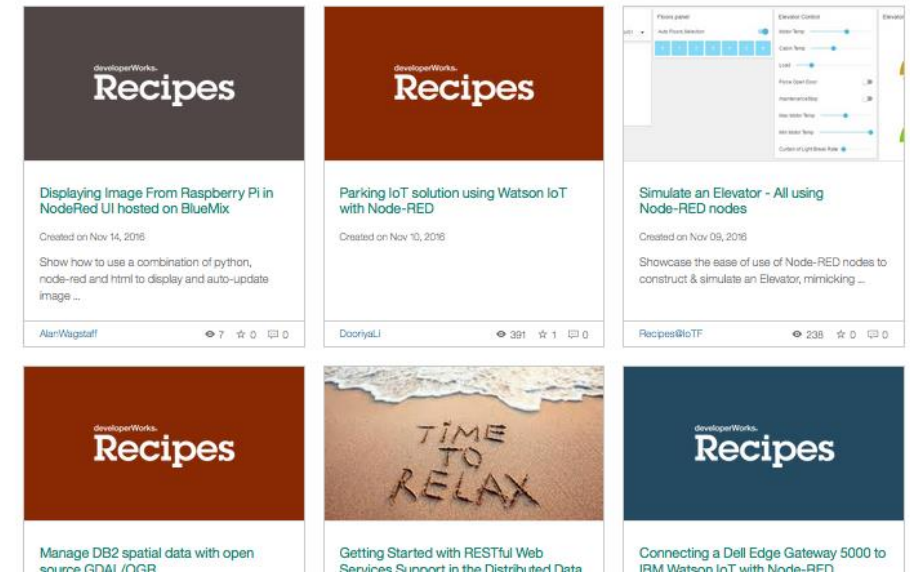

Wide variety of supported devices

- ✓ Self Service
- ✓ Open ecosystem
- ✓ Simple tutorials
- ✓ Connect in moments

Ready for IBM Watson IoT

Business Partner IBM

Ready for
IBM Watson IoT

http://ibm.biz/ready4wiot
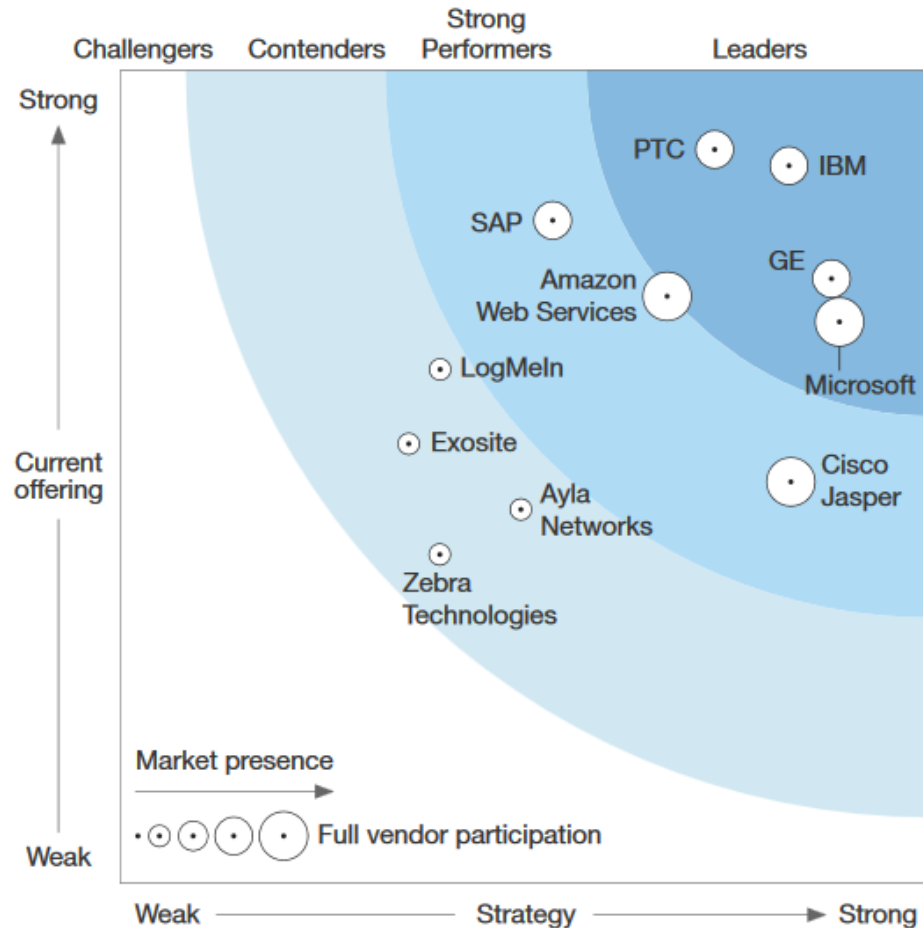
IBM is a Leader in The Forrester Wave™: IoT Software Platforms, Q4 2016

"The Watson IoT Platform can serve a broad range of advanced IoT use cases. The tech giant doubled down on IoT in 2015 with an investment of $3 billion dollars to create a new IoT business unit. The new org includes more than 1,000 researchers, developers, and designers dedicated specifically to developing the Watson IoT Platform. Since then, IBM has added significant capabilities to the platform, including augmented reality, cognitive capabilities, blockchain, edge analytics, analytics tooling, and natural language processing (to name a few). With a strong commitment to open source standards and a robust global partner ecosystem, IBM is well positioned for market leadership. However, according to some customers, Watson is not well integrated with analytics engines, and IBM's product portfolio terminology is confusing and hard to decipher."

Source: Forrester Research Inc. "The Forrester Wave™: IoT Software Platforms, Q4 2016," by Michele Pelino and Andrew Hewitt with Christopher Voce, Merritt Maxim, Frank E. Gillett, Jeffrey S. Hammond, Michael Caputo and Diane Lynch, November 15, 2016.

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Source: Forrester Research Inc. "The Forrester Wave™: IoT Software Platforms, Q4 2016," by Michele Pelino and Andrew Hewitt with Christopher Voce, Merritt Maxim, Frank E. Gillett, Jeffrey S. Hammond, Michael Caputo and Diane Lynch, November 15, 2016

Key Takeaways

✓ IBM is leveraging its capabilities in Cloud, Analytics and Security to provide **business value and transformations** to our IoT clients across all industries

✓ IBM is **investing significantly** and **relentlessly delivering** new technologies, partnerships & solutions to ensure continued leadership with IBM's Watson IoT Platform

✓ IBM is working across the entire IoT industry **to lead open standards, to educate** and **to enable** IoT innovation end to end

IBM's point of view on the Internet of Things **ibm.com/IoT**

Explore IBM Watson IoT **Play Try Buy**

Join us in our IoT conversations **@IBMIoT**

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BACKUP

IBM Watson IoT Platform | Connect

Connect your devices, equipment, and workforce to gain a new level of insight into your business

Our users include embedded developers, cloud application developers, **IoT system administrators and operators** plus **IoT device end users**

Want to **compose IoT applications quickly** and be able to **operate and manage** resulting systems.

Expect fast time-to-value, simplicity, flexibility, clear documentation.

Focus Areas

1 HTTP/S Support
Ability to send commands via HTTP/S

2 Large payload support
Supporting MBs, static images, snippets and clips, binary

3 MQTT v5
Updates to the MQTT specification, better error handling and improved efficiency

4 IPv6
Support IPv6 and IPv4 devices

5 Video and Audio
Streaming
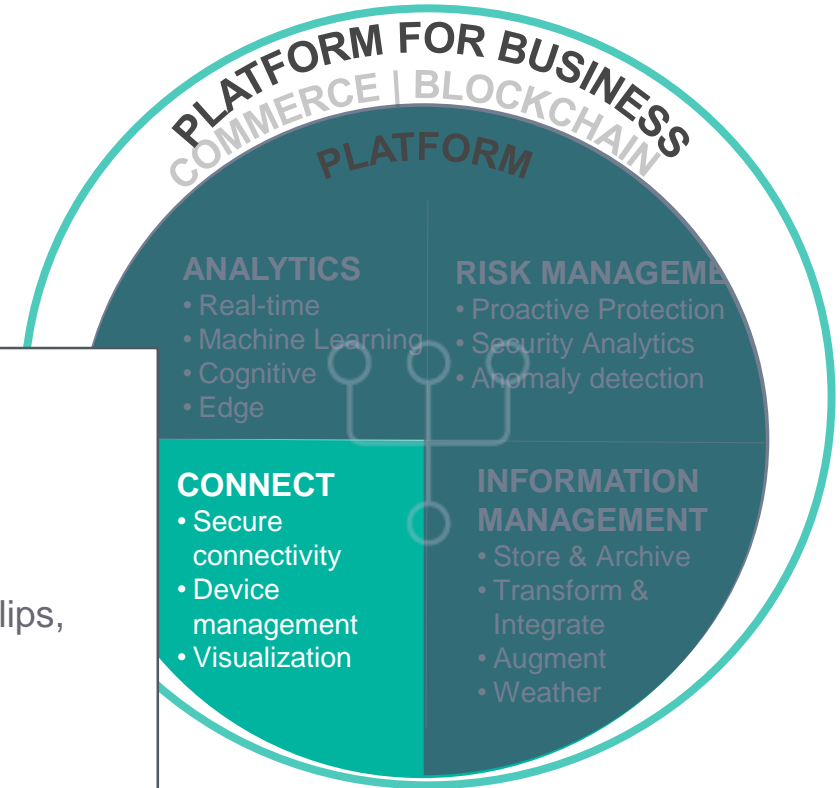
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• Augment
• Weather

IBM Watson IoT Platform | Information Management

Identify, aggregate, and transform data from your IoT sources into asset-based data structures.

Our users include, IoT Data Scientist, IoT Architects, IoT System Administrators and operators

Want to **organise and integrate the data coming in and going out of the platform.**

Expect **ease of use,** fast time-to-value, pre-integrated capabilities, flexibility.

Focus Areas

1 **Data Storage**
Providing access to the latest device data and proving a choice of historical data stores for use by IoT applications and analytics

2 **Object model for the data of my things**
As a data scientist or application developer I need access to an object model of my things that I can include in my application

3 **Integrate data from other sources**
The platform needs to be able to ingest data from other sources (such as Weather data from The Weather Company or Geospatial data services) and use it to enrich the data coming from the device

4 **3rd Party IoT Platform integration**
Provide the mechanism by which alternative IoT device platforms can connect to the Watson IoT platform

PLATFORM FOR BUSINESS
COMMERCE | BLOCKCHAIN
PLATFORM

ANALYTICS
• Predictive
• Cognitive
• Real-time
• Edge

RISK MANAGEMENT
• Proactive Protection
• Security Analytics
• Anomaly detection

CONNECT
• Secure connectivity
• Device management
• Visualization

INFORMATION MANAGEMENT
• Store & Archive
• Transform & Integrate
• Augment
• Weather

IBM Watson IoT Platform | Analytics

Leverage a host of cutting edge cognitive tools to gain a deeper understanding of your structured and unstructured data.
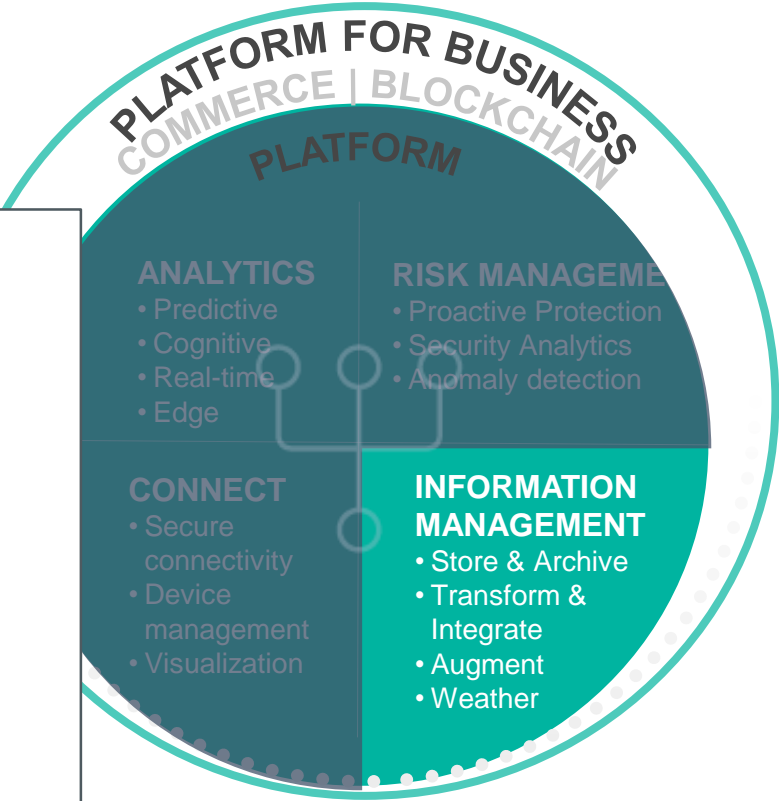
Our users include systems integrators, asset analysts, maintenance managers, cloud application developers, IoT system administrators and operators plus LOB end users

Want to **gain insights from IoT data and respond accordingly**, compose IoT applications with analytics insights and operate and manage resulting systems.

Expect ease of use, fast time-to-value, pre-integrated capabilities, flexibility.

Focus Areas

1 Real-Time
Enhance capabilities with more advanced rules and analytical capabilities, including the infusion of machine learning

2 Machine Learning
Integrate analytical modeling to predict machine and process health, failures, quality, etc. to forecast business critical issues
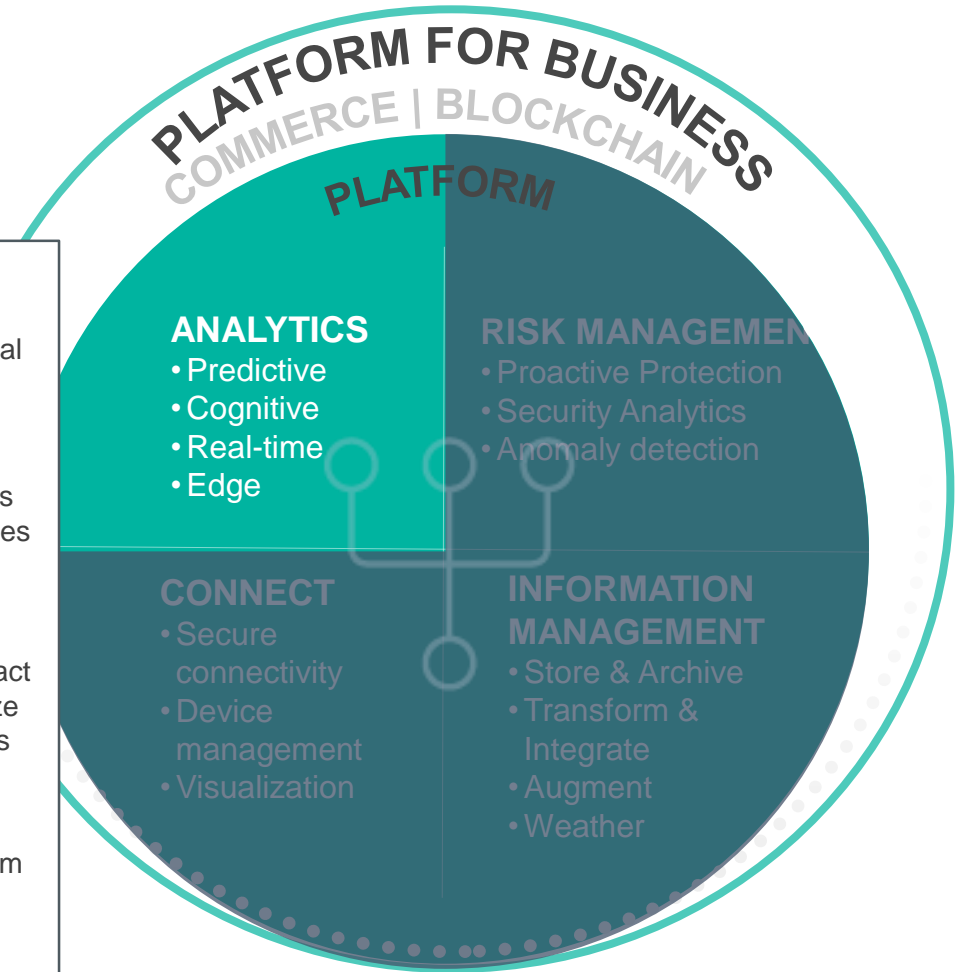
3 Cognitive
Integrate cognitive capabilities to enable solutions that interact naturally with humans, learn from historical data, and analyze image and textual data sources to enrich analytics & insights

4 Edge
Enable flexible model allowing analytics to be distributed from cloud to edge for data & decision efficiency

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IBM Watson IoT Platform | Risk Management

Manage risk and gather insights across your entire IoT landscape.

Our users Adam and Sally

Want to know that they have a secured IoT environment and know what to do when threats are detected

Expect to only have to work with out-of-the-ordinary situations. Known situations are handled by the system.

Focus Areas

1 Advanced Protection
Protect devices and data through Authentication, Authorization & Access Control. Data privacy standards and data masking.

2 Advanced Device Management
Register devices for secure operations by defining and managing cryptographic key material. Protect devices against operational compromise. Respond to device level threats and attacks. Resolve compromised devices
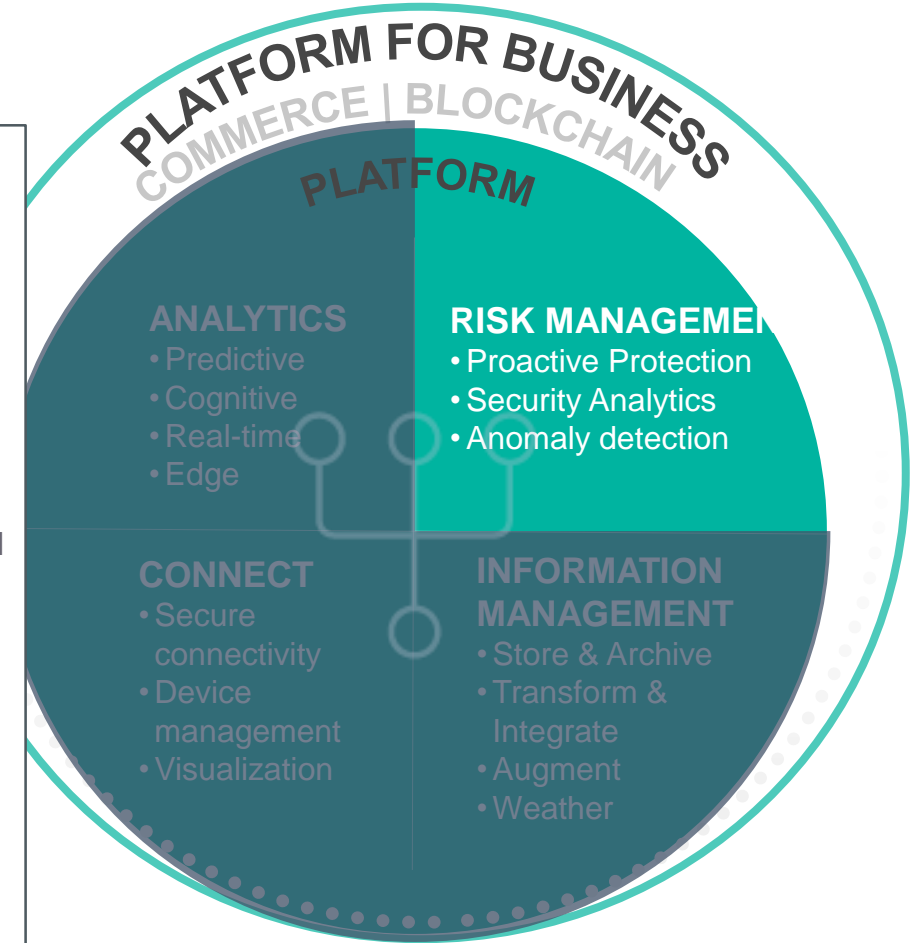
3 Security Dashboard
Visualization of security status and easy access to device management and operations

4 Security Policy Definition & Management
Anomaly detection to quickly spot security and critical issues

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Risk and Security Management
Professional Services

IoT Security Assessment
Assess IoT risks specific to your solution context

IoT Data Anonymization
Protect your IoT data using IBM tooling and experts
Ensure data privacy while maximizing data utility

IoT Threat Intelligence
Enable your enterprise to respond IoT Security events by understanding them in real-time