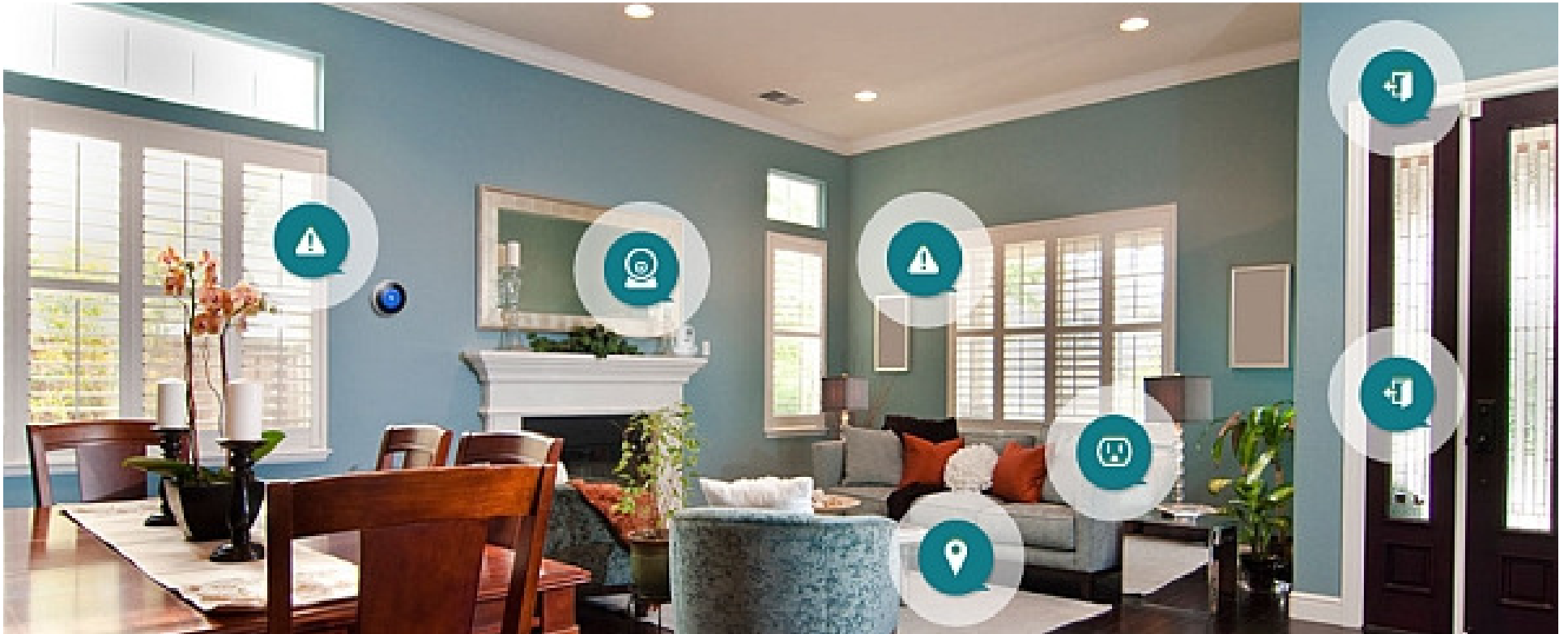


A large, light teal L-shaped graphic is positioned to the left of the title. It is composed of two rounded rectangular blocks joined at their corners.

## Connecting the dots

John Koot

9/25/2015



## Connecting the dots

John Koot

9/25/2015



## Introduction



### **John Koot**

Windows Embedded / IoT MVP

IoT Business Development Manager

[John.Koot@ict.nl](mailto:John.Koot@ict.nl)

+31 6 2708 7406



What is it





## What is the Internet of Things?



# The Internet of Things can seem...



Gartner

ORACLE

FORRESTER

IDC  
Analyze the Future

Google

intel

IBM



CISCO

- How (where) do we get started?
- Who can really help us?
- Do we need to start over?
- Should we wait?
- What technology do we need?

## ...big

So many devices and so much data

## ...noisy

So many options

## ...confusing

So many possible decisions



## Where do our customers see the opportunity?

New business  
models



Optimize  
core  
operational  
processes




Boost  
(product)  
innovation



Customer





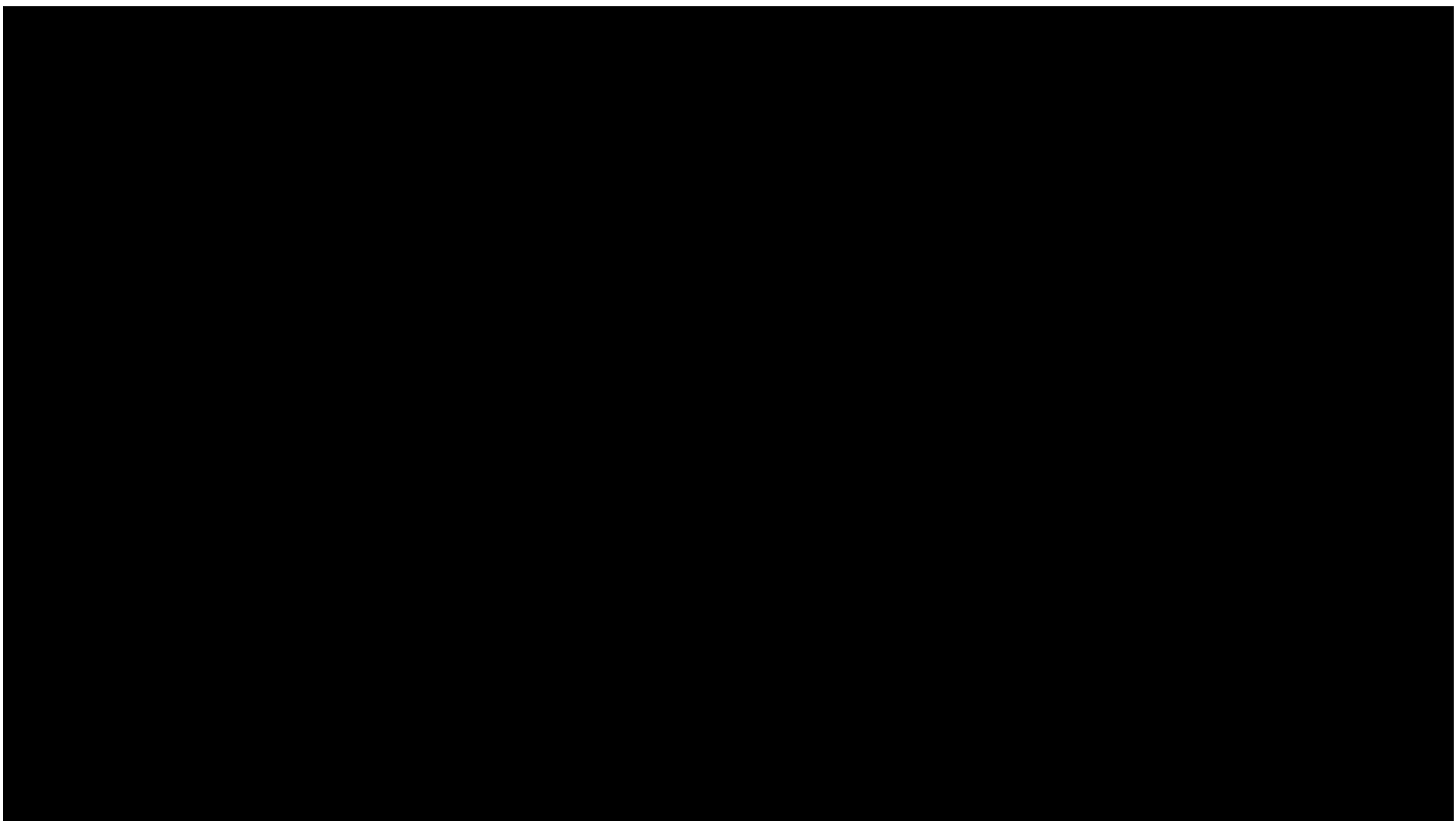


"We wanted to go beyond the industry standard of preventative maintenance, to offer predictive and even preemptive maintenance, so we can guarantee a higher uptime percentage on our elevators."

**ANDREAS SCHIERENBECK**  
CEO  
THYSSEN KRUPP ELEVATORS



**ThyssenKrupp**



NS project instAPP







Vind je plek met iNStApp

# Why Microsoft?

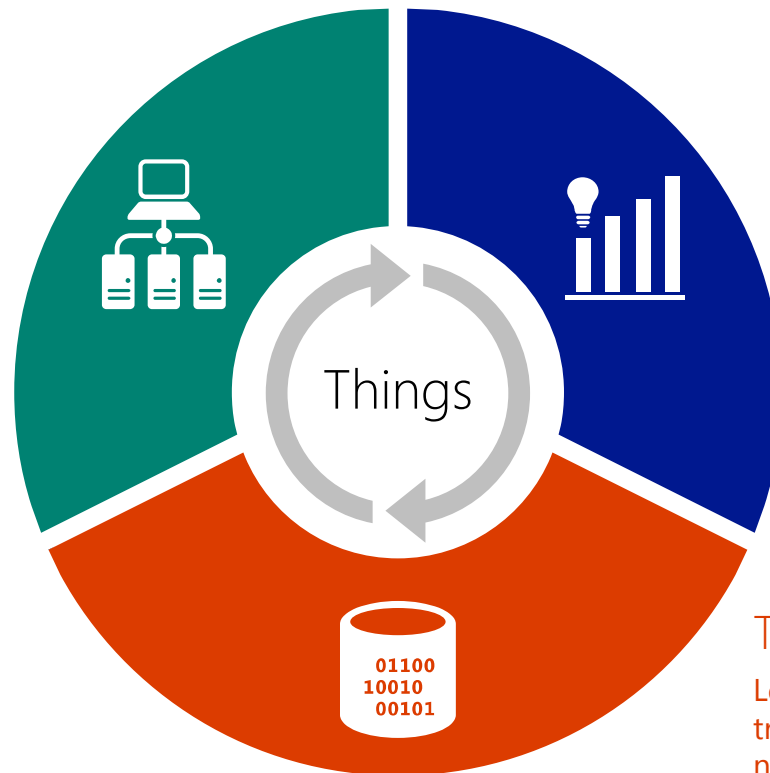




## Microsoft has the technology that brings IoT to life

### Improve efficiency

Monitor and track the health of your assets to reduce costs



### Enable innovation

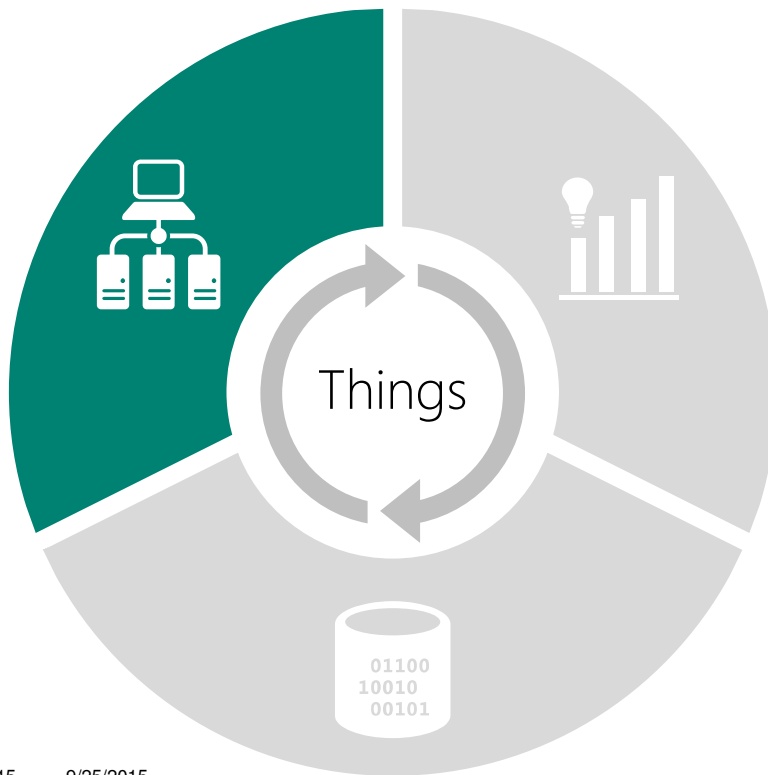
Analyze data from multiple sources in real time to drive revenue

### Transform your business

Leverage advanced analytics to transform your business by creating new business models and revenue streams



## Improve efficiency



Monitor and track the health of your assets to reduce costs

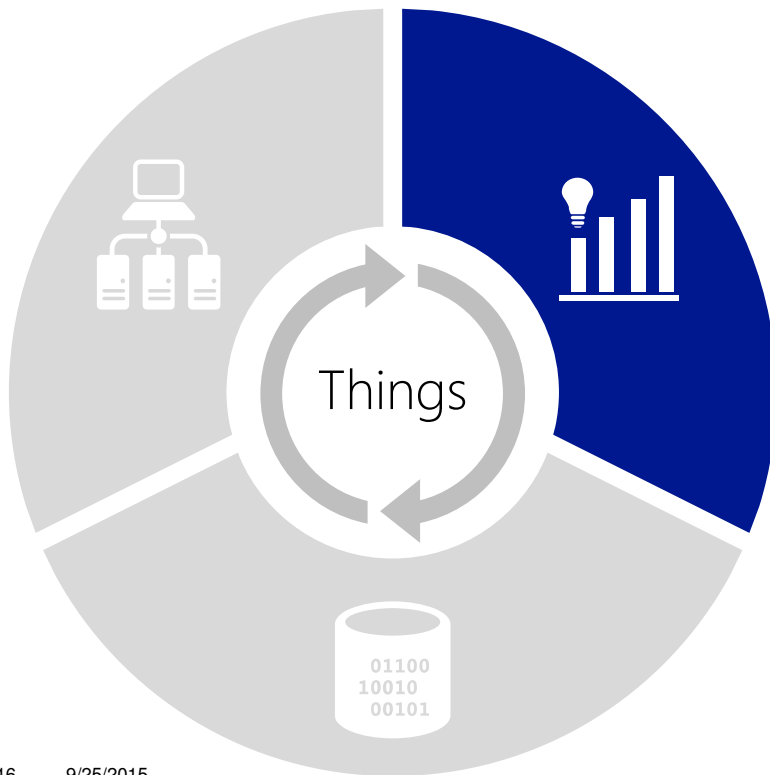
Reduce the burden of connecting disparate line of business assets

Log millions of events per second in near real time

Establish rules and alerts for proactive monitoring



## Enable innovation



Analyze data from multiple sources in real time to drive revenue

Uncover real time insights from streaming data and events

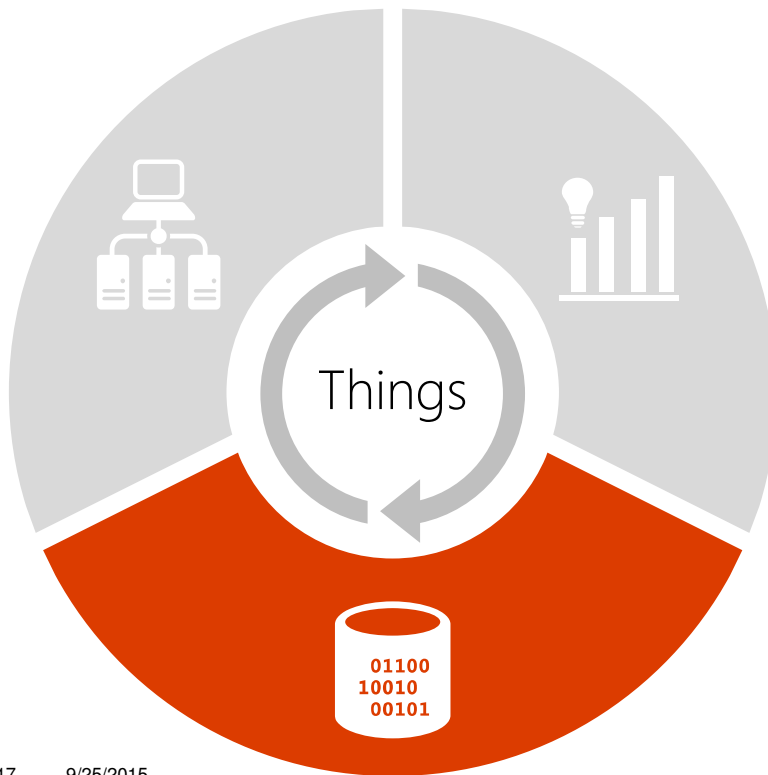
Predict future outcomes by combining live operational data with historical data

Notify the right team or department in your business when action is needed





## Transform your business

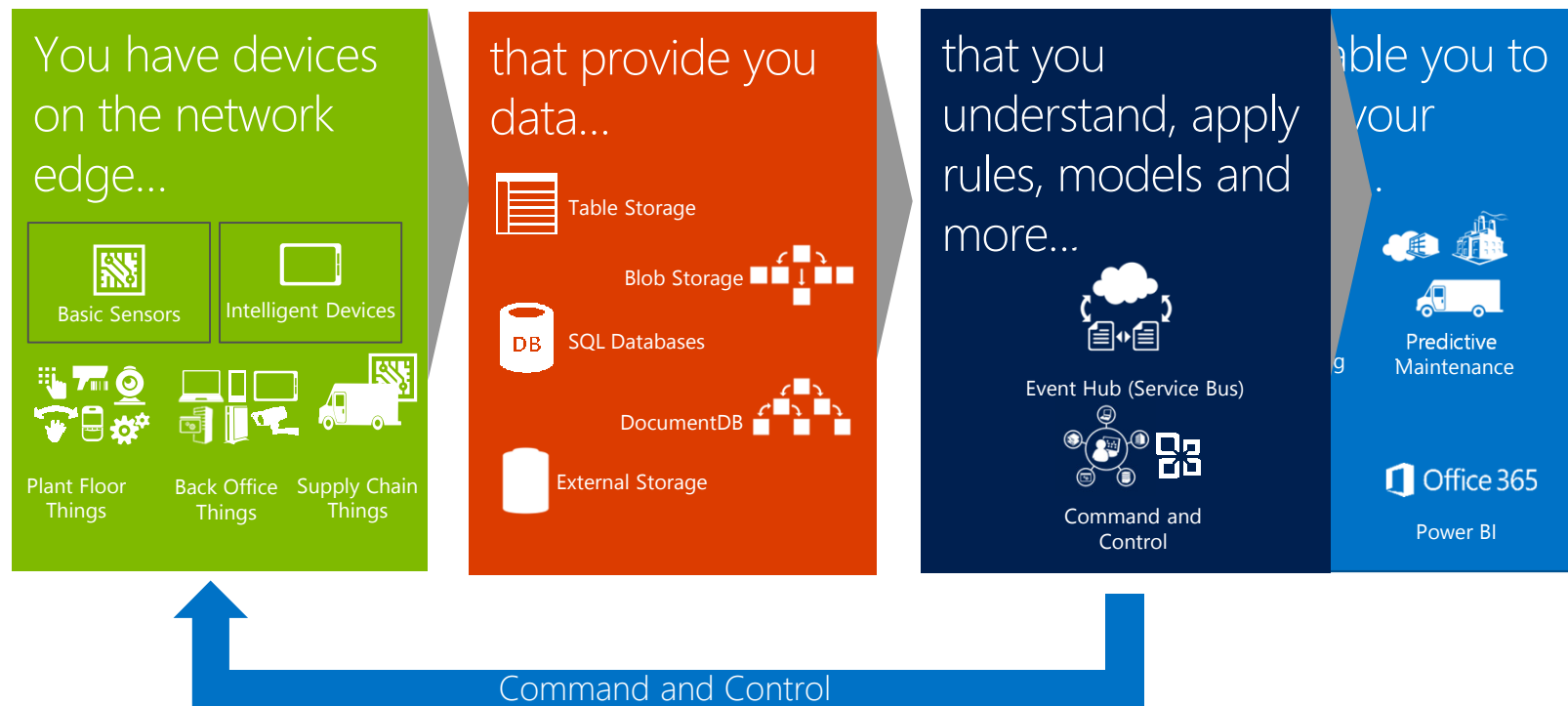


Leverage advanced analytics to transform your business by creating new business models and revenue streams

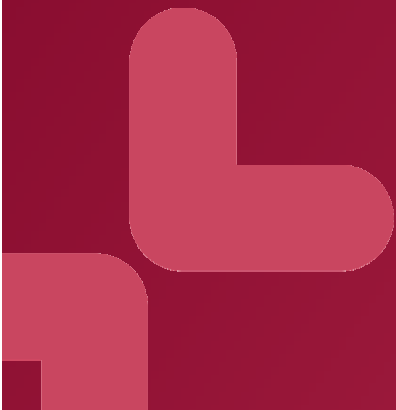
Microsoft's data platform and solutions empower enterprises to transform the raw data from its "things" into actionable insights and business results.



## Microsoft's Approach to IoT



# Architecture



## Comprehensive solutions from device to cloud



### IoT Editions Power a Broad Range of Devices

20 years of history in embedded devices

One Windows platform for all devices

Enterprise-ready, Maker-friendly

Designed for today's IoT environments

Free IoT Core edition!

### Cloud-Based IoT Services & Solutions

Easy to provision, use and manage

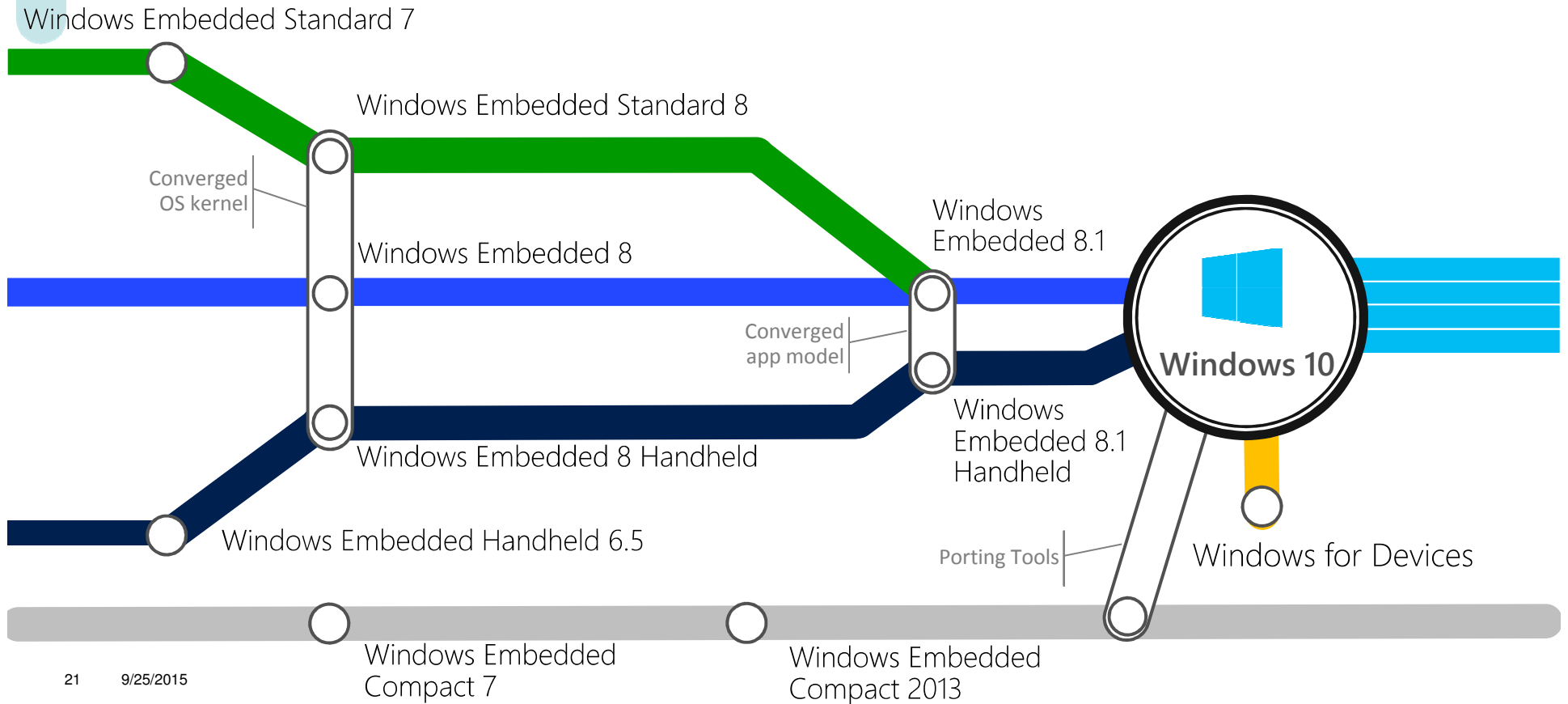
Pay as you go, scale as you need

Global reach, hyper scale

End-to-end security & privacy

Windows, Mbed, Linux, iOS, Android, RTOS support

# Platform Convergence Journey



# Windows 10 IoT Editions

## Windows 10 IoT for industry devices

Desktop Shell, Win32 apps, Universal apps and drivers  
 Minimum: 1 GB RAM, 16 GB storage  
 X86/x64

## Windows 10 IoT for mobile devices

Modern Shell, Mobile apps, Universal apps and drivers  
 Minimum: 512 MB RAM, 4 GB storage  
 ARM

## Windows 10 IoT Core

Universal Apps and Drivers  
 No shell or MS apps  
 Minimum: 256MB RAM, 2GB storage  
 X86/x64 or ARM



Windows Updates



Visual Studio & UWP



New User Interfaces



Security & Identity



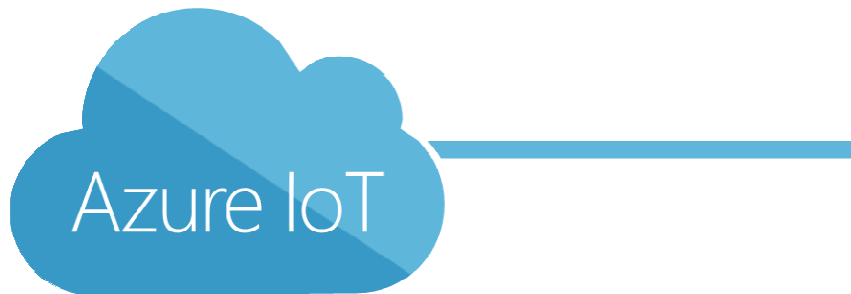
Integrated Device Connectivity



Microsoft Azure IoT



## Cloud Based IoT Solutions



Easy to provision, use and manage

Pay as you go, scale as you need

Global reach, hyper scale

End to end security & privacy

---

### Three parts of an IoT solution

1

Device connectivity & management

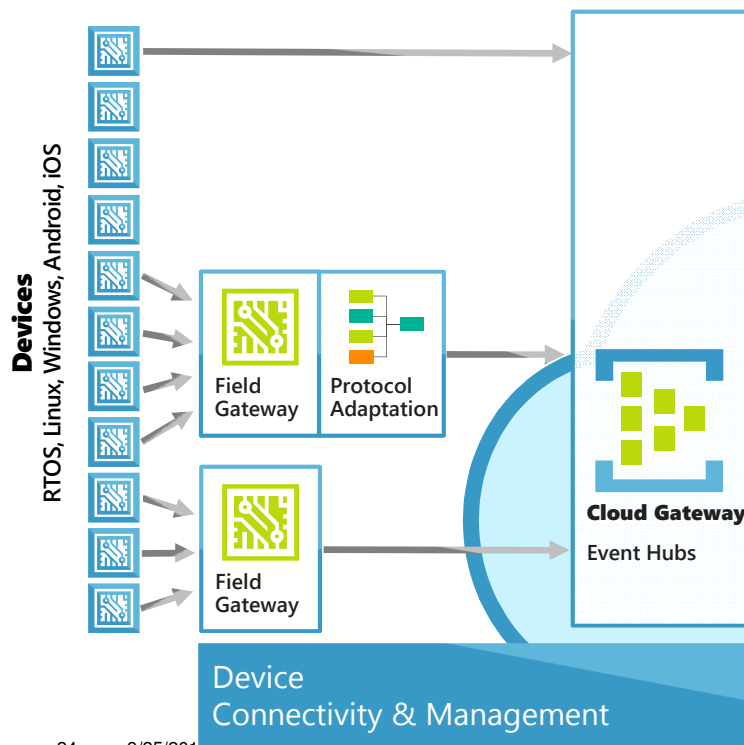
2

Analytics & operationalized insights

3

Presentation & business connectivity

# IoT Device & Cloud Patterns

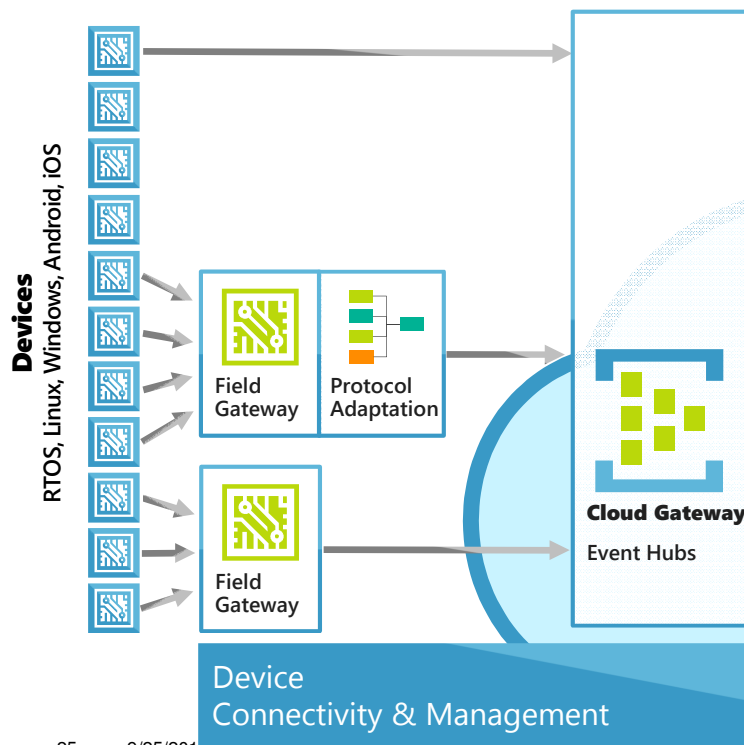


## Event Hubs

- High scale telemetry ingestion service
- HTTP/AMQP protocol support
- Each Event Hub supports
  - 1 million publishers
  - 1GB/s ingress
- Generally available worldwide
  - 18 Billion messages per day
  - 60+ TB ingested per day



## IoT Device & Cloud Patterns

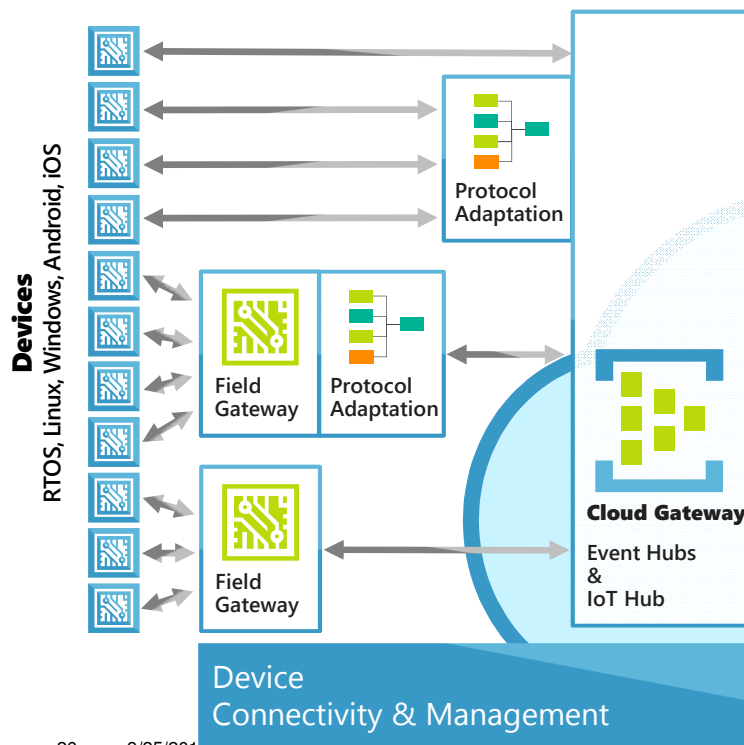


### Additional IoT Needs

- Command & control
- Device identity
- Device registry
- Device management

Coming with the Azure IoT Suite...

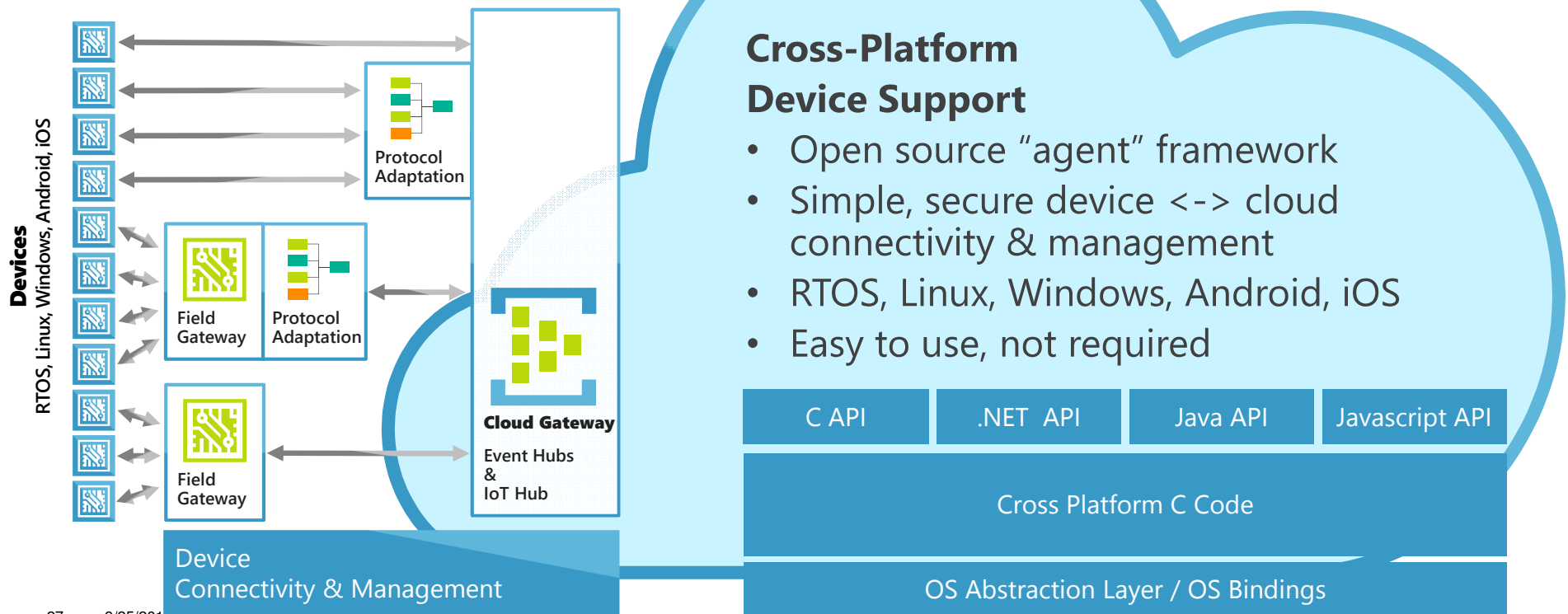
## IoT Device & Cloud Patterns



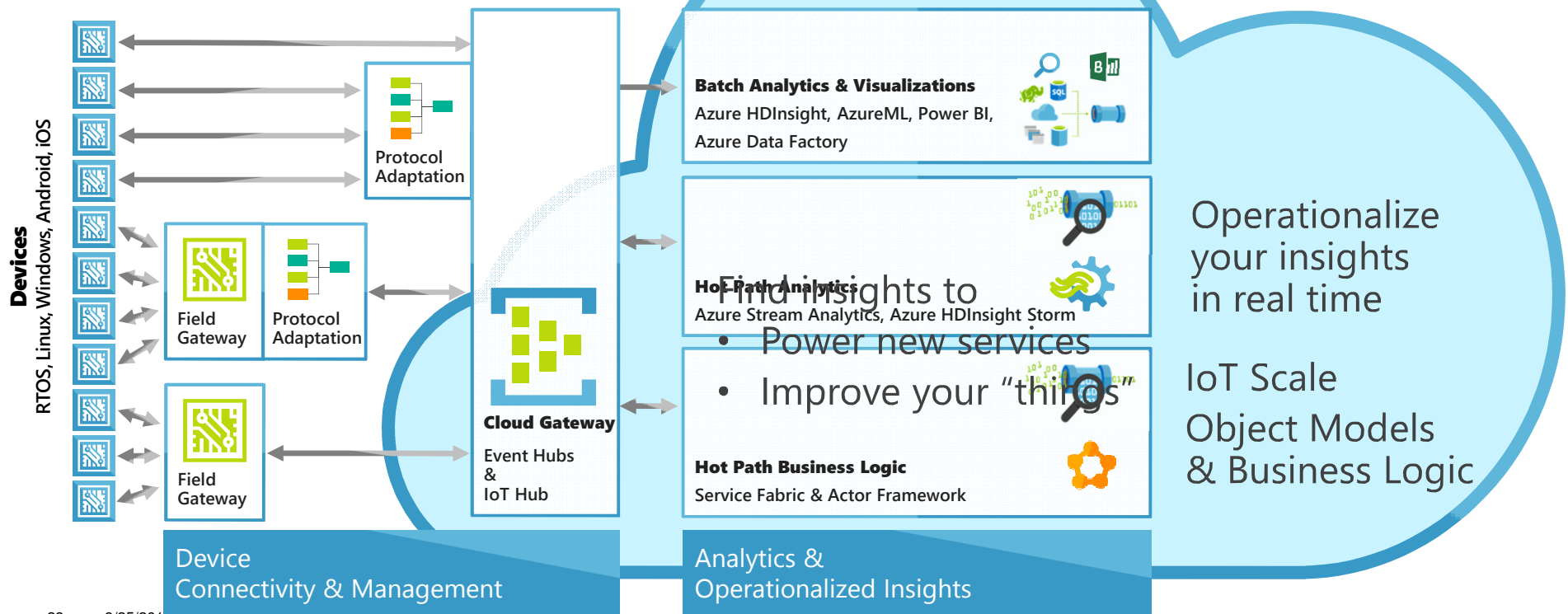
### IoT Hub

- Capability of the Azure IoT Suite
- Bi-directional device <-> cloud
- Up to 10 million devices
- Telemetry ingestion
- Command & control
- Device registry & identity
- Device Management
- HTTP/AMQP
- Extensible protocol support / MQTT

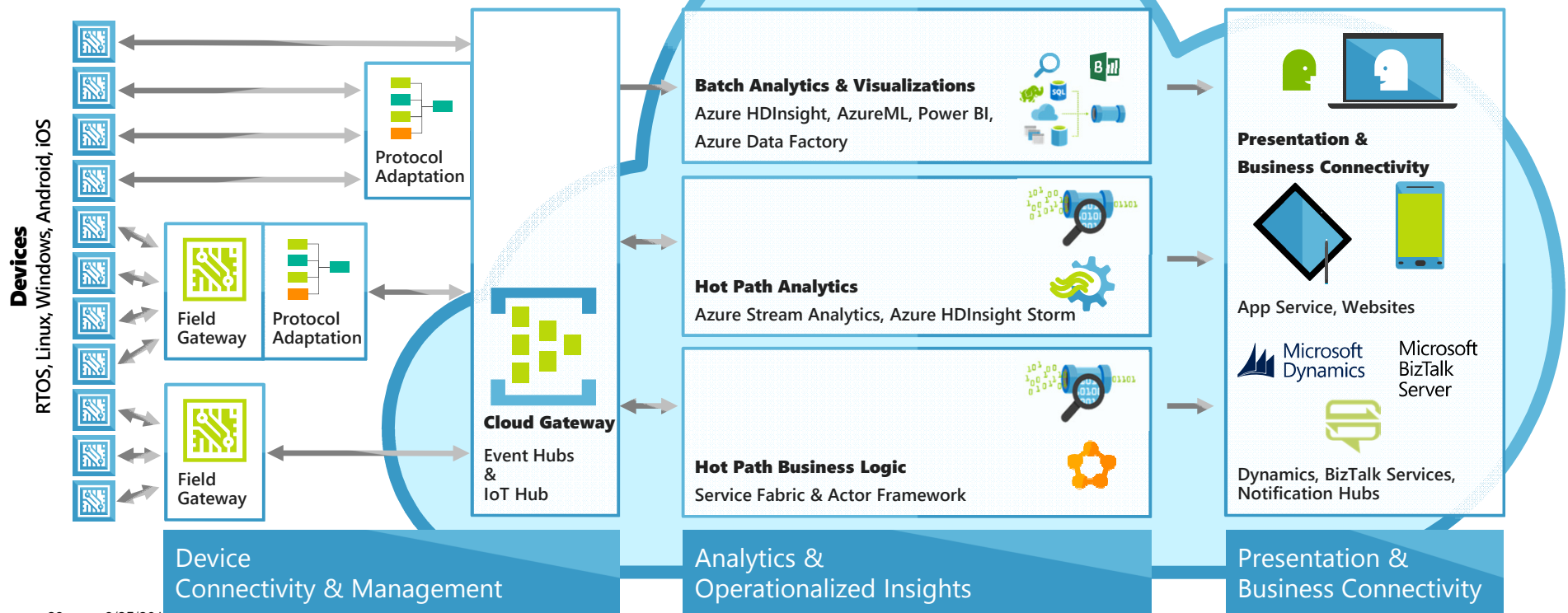
# IoT Device & Cloud Patterns



# IoT Device & Cloud Patterns



















# IoT Device & Cloud Patterns





## Microsoft Azure IoT services

Devices	Device Connectivity	Storage	Analytics	Presentation & Action
	 Event Hubs	 SQL Database	 Machine Learning	 App Service
	 Service Bus	 Table/Blob Storage	 Stream Analytics	 Power BI
	 External Data Sources	 DocumentDB	 HDInsight	 Notification Hubs
		 External Data Sources	 Data Factory	 Mobile Services
				 BizTalk Services

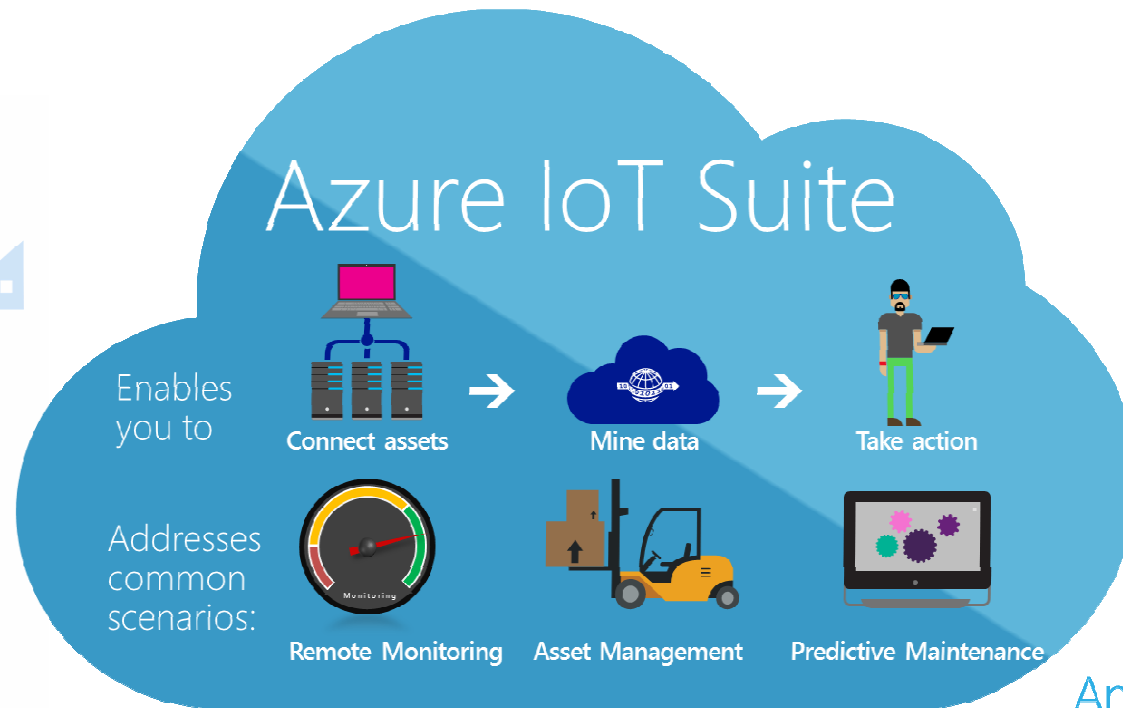


## Coming Soon: Microsoft Azure IoT Suite

- **Accelerate time-to-value**
  - Easy deployment of IoT applications for the most common use cases
  - Remote monitoring, asset management, and predictive maintenance
- **Simplified & predictable billing**
  - Plan and budget appropriately through a simple predictable business model
- **Scale to meet your needs without redesigning**
  - Start with a proof of concept
  - Grow and extend to support millions of assets without redesigning

# Accelerate your business transformation

Azure IoT services

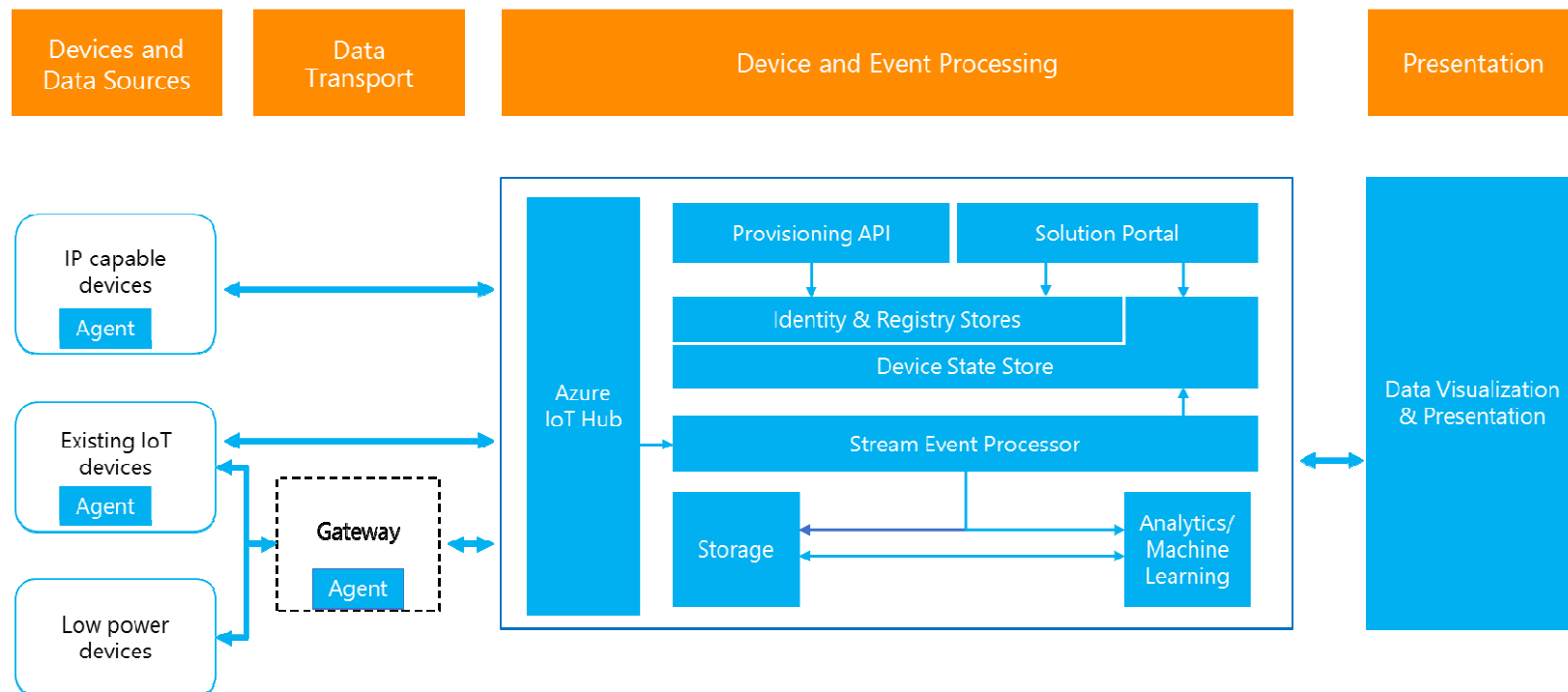


And more...





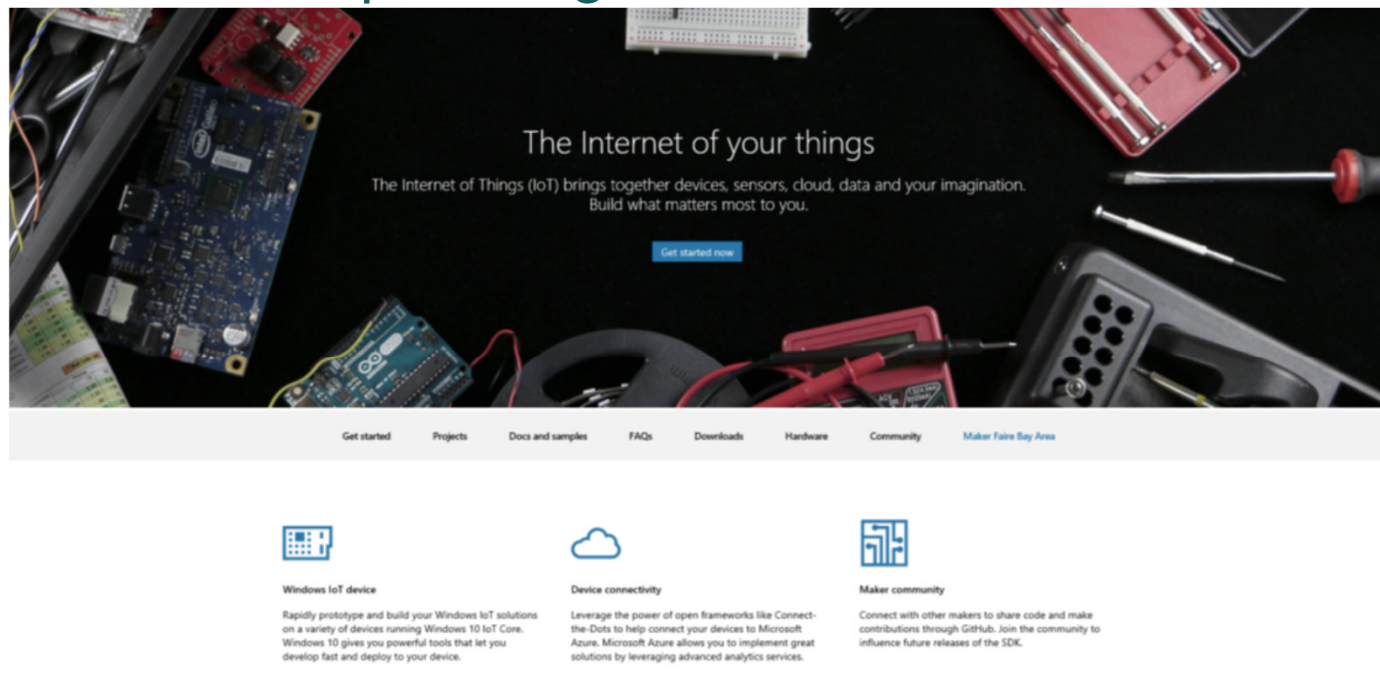
# Azure IoT Services Reference Architecture



Start small, grow fast



## Windows Developer Program for IoT



- <https://dev.windows.com/en-US/iot>



# ConnectTheDots.io



MSOpenTech / connectthedots

Connect tiny devices to Microsoft Azure services to build IoT solutions <http://connectthedots.io>

532 commits · 4 branches · 0 releases · 18 contributors

branch: master connectthedots / +

Added message about East US location to AzurePrep.

dimariso authored 5 days ago · latest commit: c7157c99f8

Azure: Added message about East US location to AzurePrep. 6 days ago

Devices: Adds new scripts to deploy\_next 8 days ago

gitignore: Initial commit for Bluetooth 2 months ago

gitmodules: Moved Windows RP2 Example to a properly named folder and added submo... a month ago

Architecture.png: fixing broken image links in documentation 27 days ago

Arduino-Pi-to-T.png: updating images 3 months ago

CTD-logo-v5-02.png: documentation changes 3 months ago

ConnectTheDots-Temp-and-...: fixing broken image links in documentation 27 days ago

ConnectTheDots-architecture...: fixing broken image links in documentation 27 days ago

Contribute.md: Adding contribute.md file 6 months ago

WebSiteCapture.png: fixing broken image links in documentation 27 days ago

edit.cmd: copyright and line endings 3 months ago

license.txt: Original commit 7 months ago

notice.txt: Removed Arduino Weather Shield, added TI SensorTag 2 months ago

readme.md: putting link to SA instructions 21 days ago

readme.md

Connect the Dots

Big Data Near Real-time Analytics

Data Ingestion Machine Learning

Sensors Gateway Sensors Apps and online dashboards

In this project there are code samples, configuration scripts and guides that will help you set up devices and sensors, and configure Microsoft Azure services to view and analyze the data produced by those devices. Some of these samples have been provided by MS Open Tech, others by third parties; we encourage everyone to submit code samples or configuration documentation to grow this project.

A good first task, which we are calling the "Connect The Dots starter solution" is to build a simple temperature sensing network. It can be built quickly and easily with minimal knowledge of programming or Microsoft Azure, using commodity devices available locally or online - for example an Arduino UNO board with a weather shield, connected to a Raspberry Pi sending data to an Azure website.

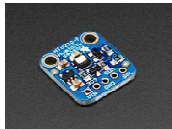
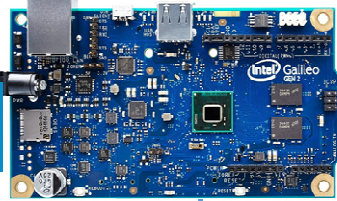
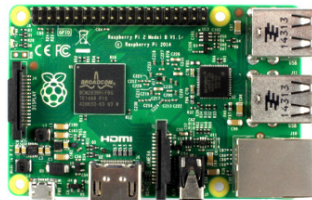
Arduino + sensors Raspberry Pi Microsoft Azure

ShowTime

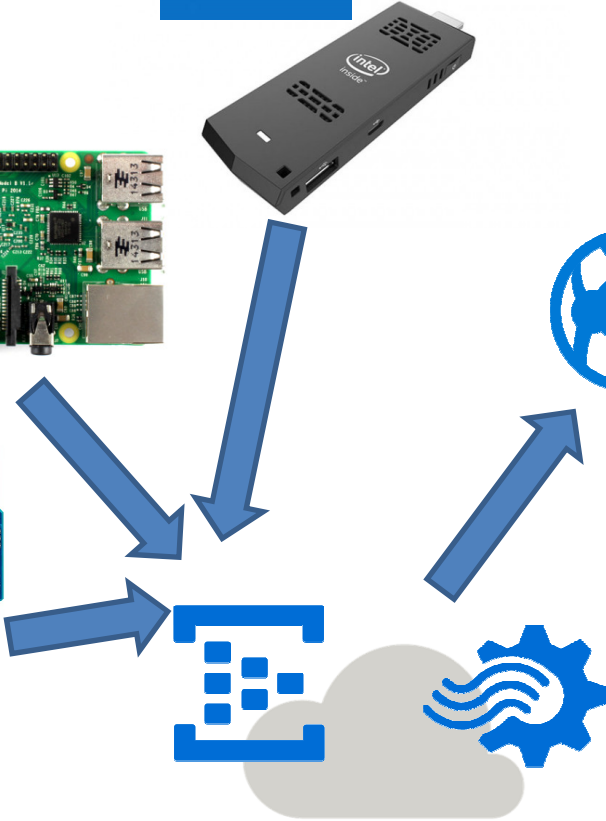




Showtime

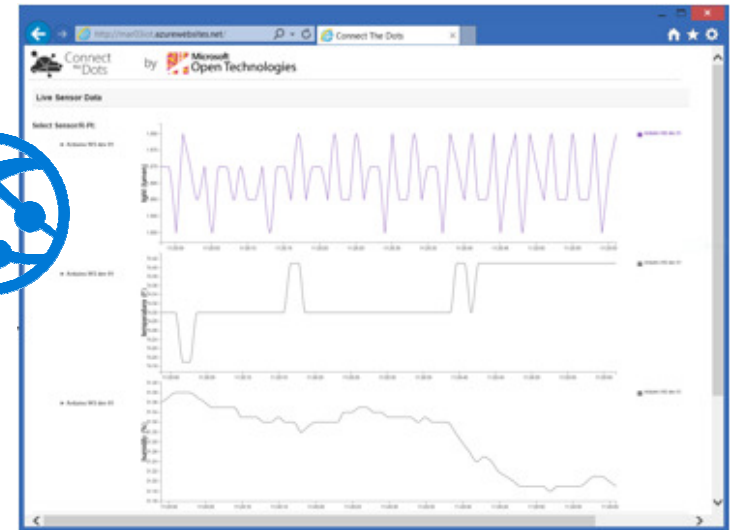


I2C



Connect the Dots

ICT+





Intelligence Connected Together