The World of IoT.
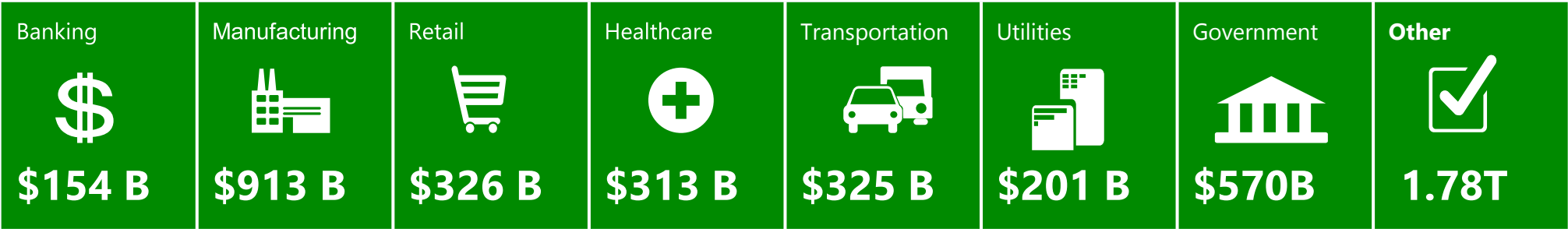
Sergiy Poplavskiy
DX, Microsoft Ukraine
v-spopla@microsoft.com

Worldwide Internet of Things Revenue Opportunity
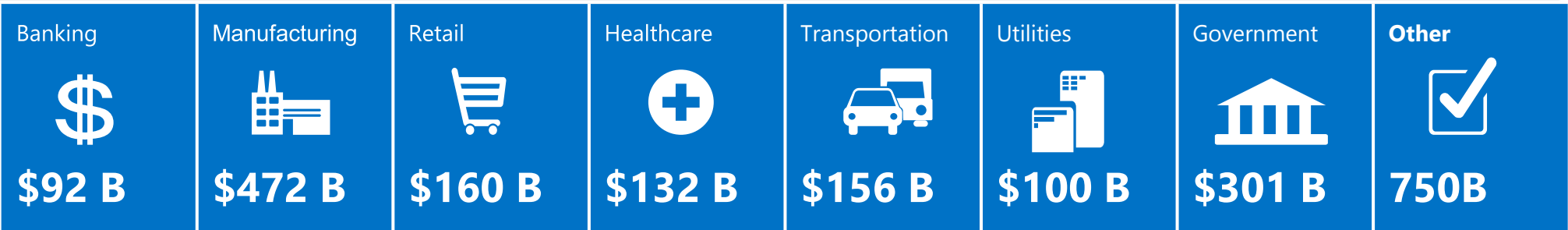
2018

$4.93T

Banking	Manufacturing	Retail	Healthcare	Transportation	Utilities	Government	**Other**
$154 B	**$913 B**	**$326 B**	**$313 B**	**$325 B**	**$201 B**	**$570B**	**1.78T**

2014

$1.93T

Banking	Manufacturing	Retail	Healthcare	Transportation	Utilities	Government	**Other**
$92 B	**$472 B**	**$160 B**	**$132 B**	**$156 B**	**$100 B**	**$301 B**	**750B**

IDC, Internet of Things Spending Guide by Vertical Market, 2014

Why now ?

```c
#include <avr/io.h>

int main(void)
{
    DDRB |= (1 << PB3);          /* Set PORTB bit 4 to output. */
    // Set the ADC input to PB2/ADC1
    ADMUX |= (1 << MUX0);
    // Set the prescaler to clock/128 & enable ADC
    ADCSRA |= (1 << ADPS1) | (1 << ADPS0) | (1 << ADEN);

    while(1)
    {
        // Start the conversion
        ADCSRA |= (1 << ADSC);
        // Wait for it to finish
        while (ADCSRA & (1 << ADSC));

        if((ADCH << 8) | ADCL > 0x0200)
        {
            PORTB |= (1 << PB3);
        }
        else
        {
            PORTB &= ~(1 << PB3);
        }
    }
}
```
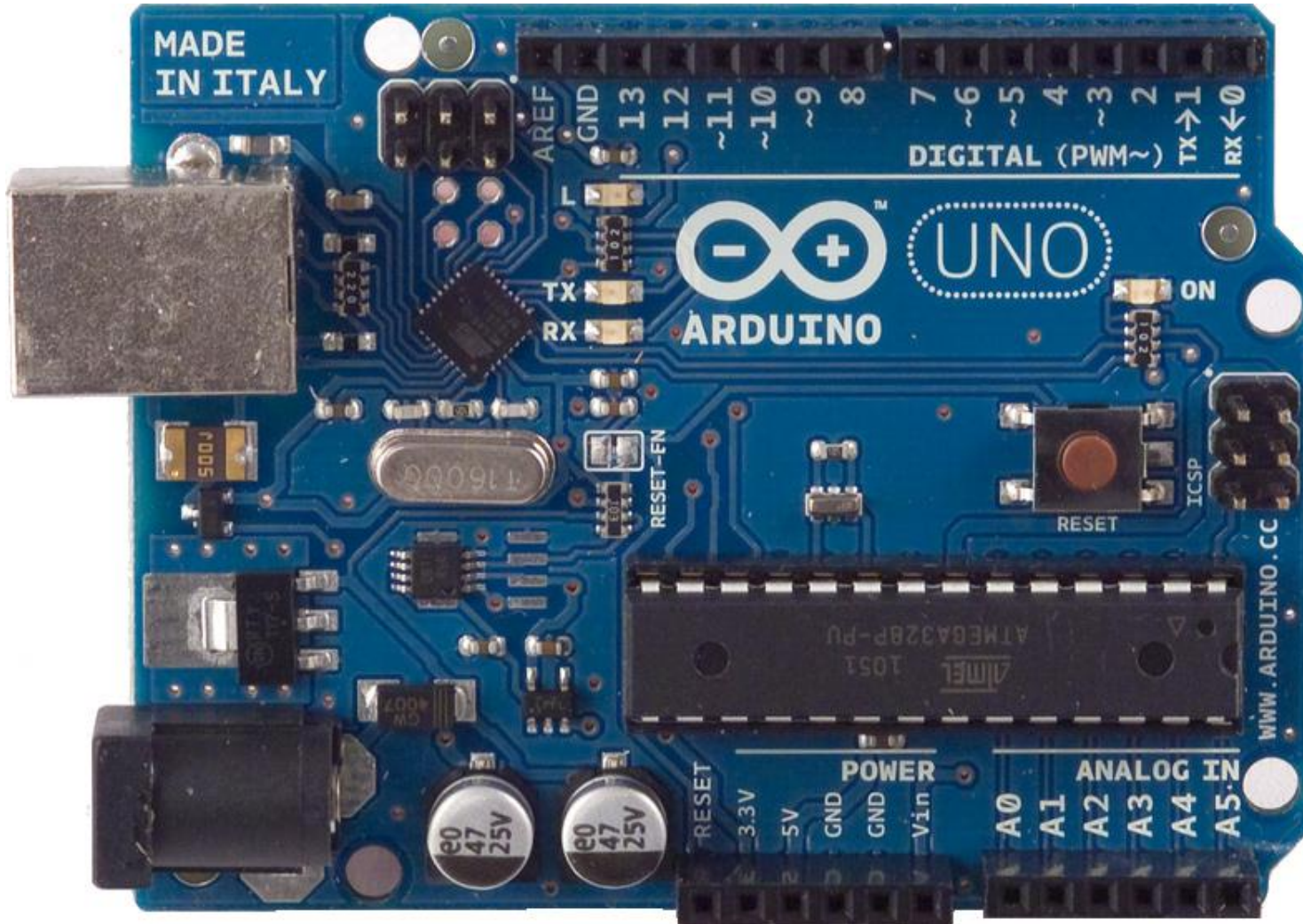
```c
void setup()
{
    pinMode(13, OUTPUT);
}

void loop()
{
    if(analogRead(A0) > 300)
    {
        digitalWrite(13, HIGH);
    }
    else
    {
        digitalWrite(13, LOW);
    }
}
```

Arduino

MC: Atmega328

8 bit, 16 MHz

Flash: 32KB of which 0.5 KB used by bootloader

SRAM: 2KB

EEPROM: 1KB

.NET Micro Framework
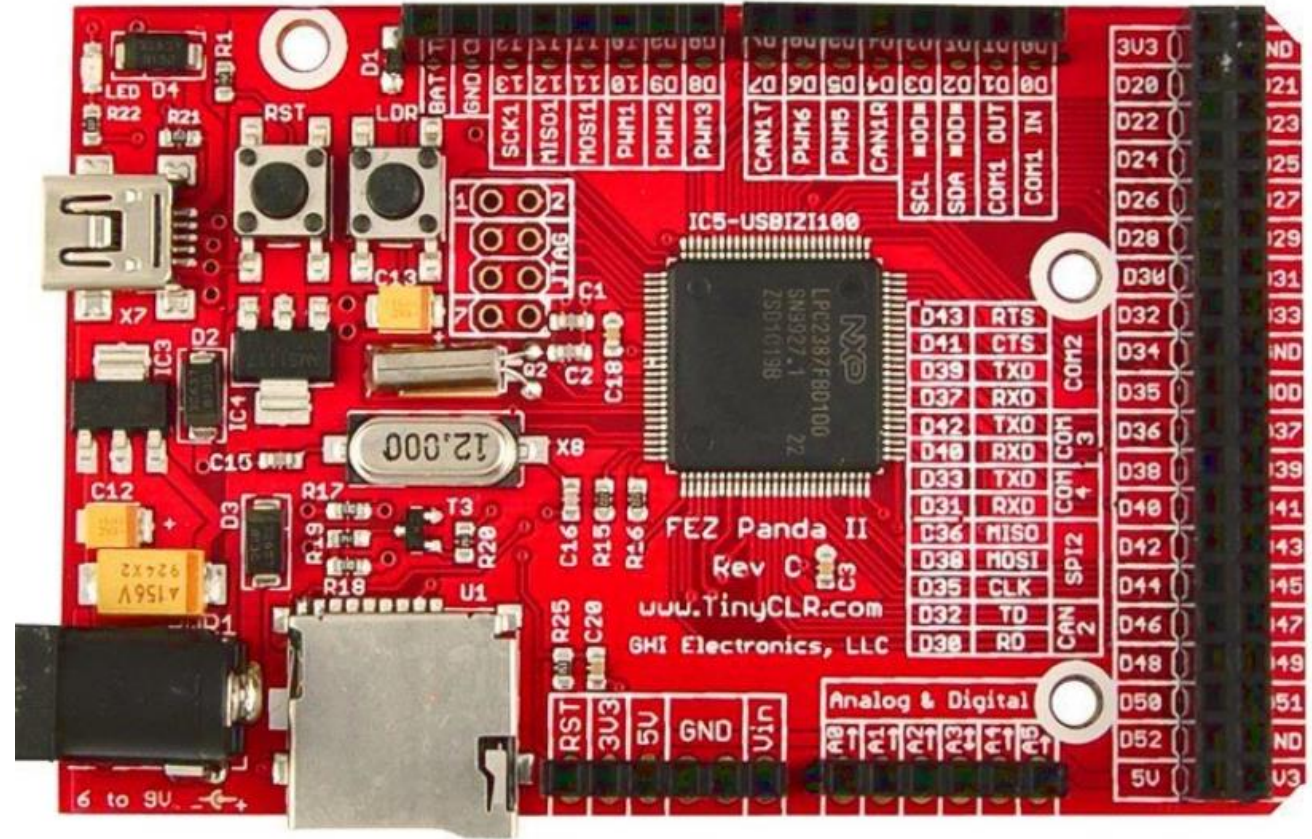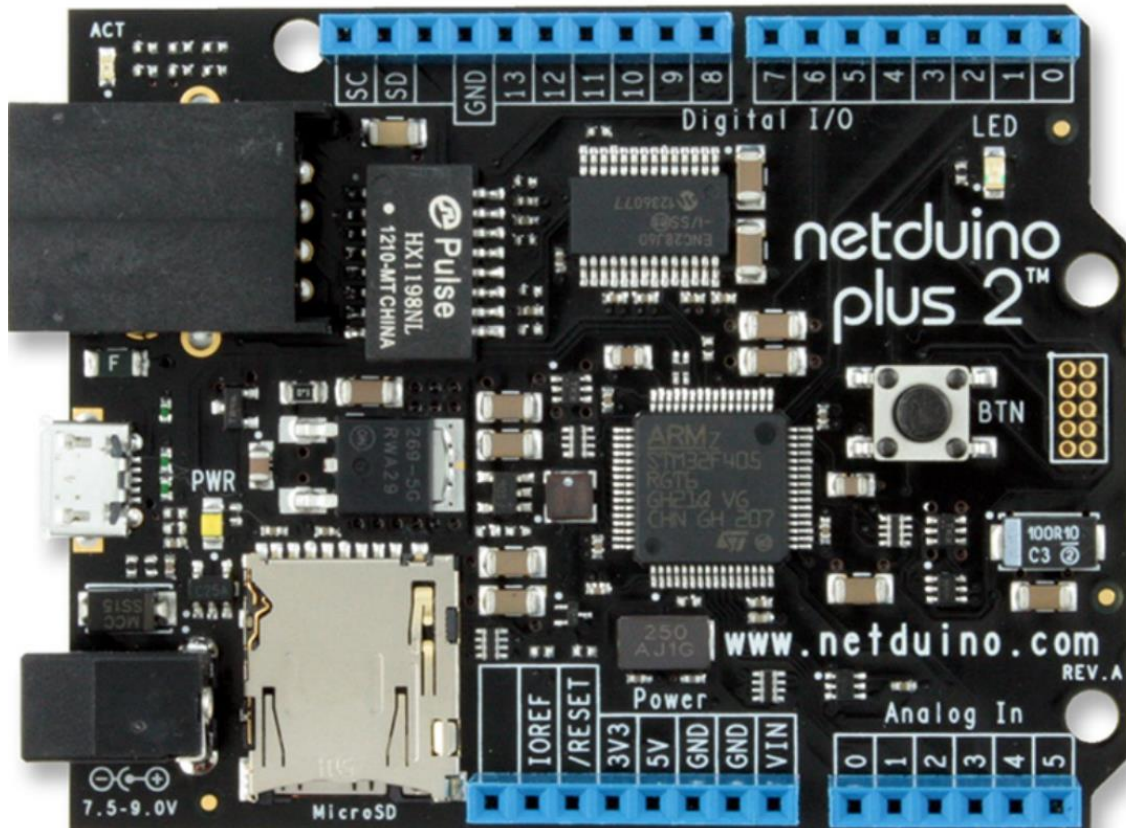
Open Source

Apache 2.0 License

MS Open Technologies

For resource constrained devices

Microcontroller based devices

RAM and storage requirements in hundreds of Kilobytes

.Net micro framework devices

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

Windows IoT devices

Quad-core ARM Cortex-A7 CPU
1GB LPDDR2 SDRAM
Micro SD, Ethernet, USB, HDMI

Intel Atom E3800 Processor
1GB DDR3 RAM
Micro SD, Ethernet, USB, HDMI
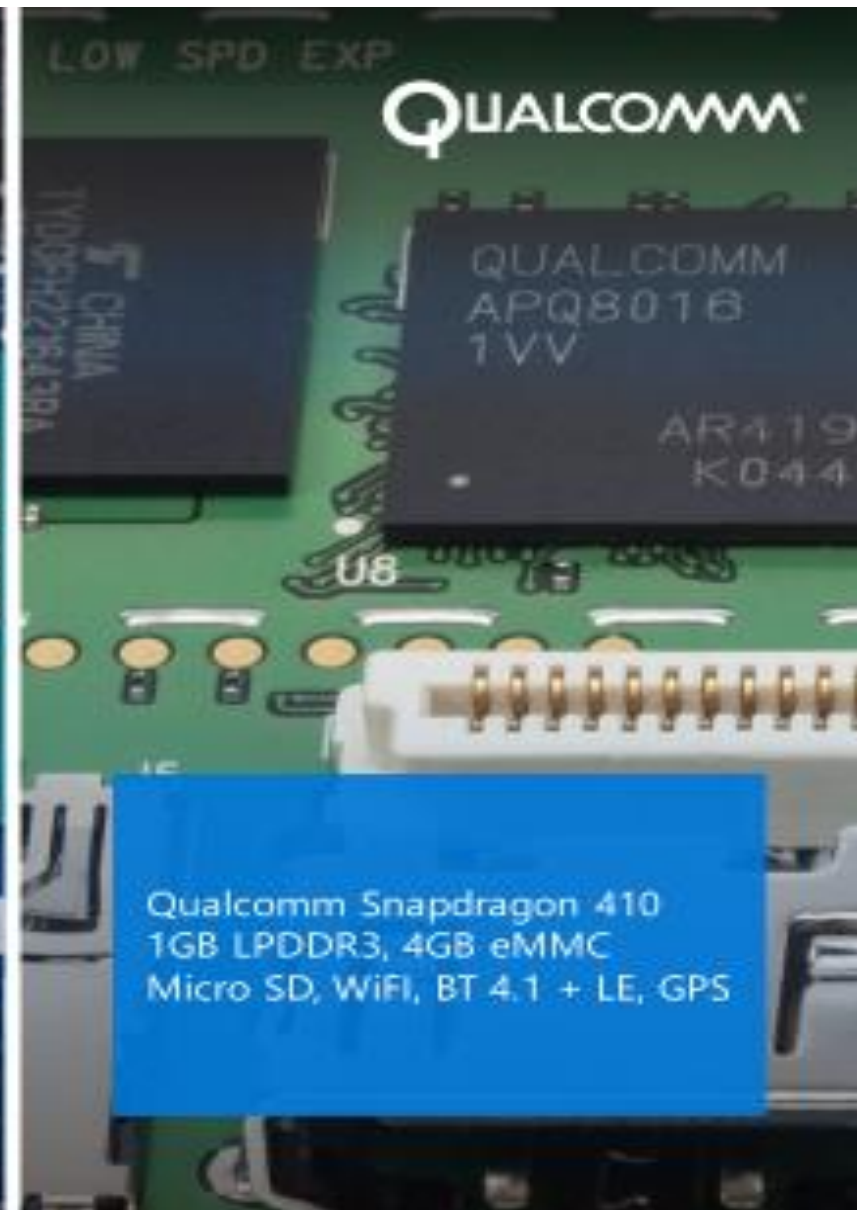
Qualcomm Snapdragon 410
1GB LPDDR3, 4GB eMMC
Micro SD, WiFi, BT 4.1 + LE, GPS

Universal App Platform

Phone

Tablet

Desktop

Surface Hub

Xbox

Wearables +

Windows Universal Platform

Adaptive UI + Controls

Natural User Inputs

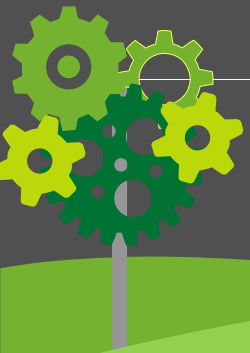Live Tiles + Notifications
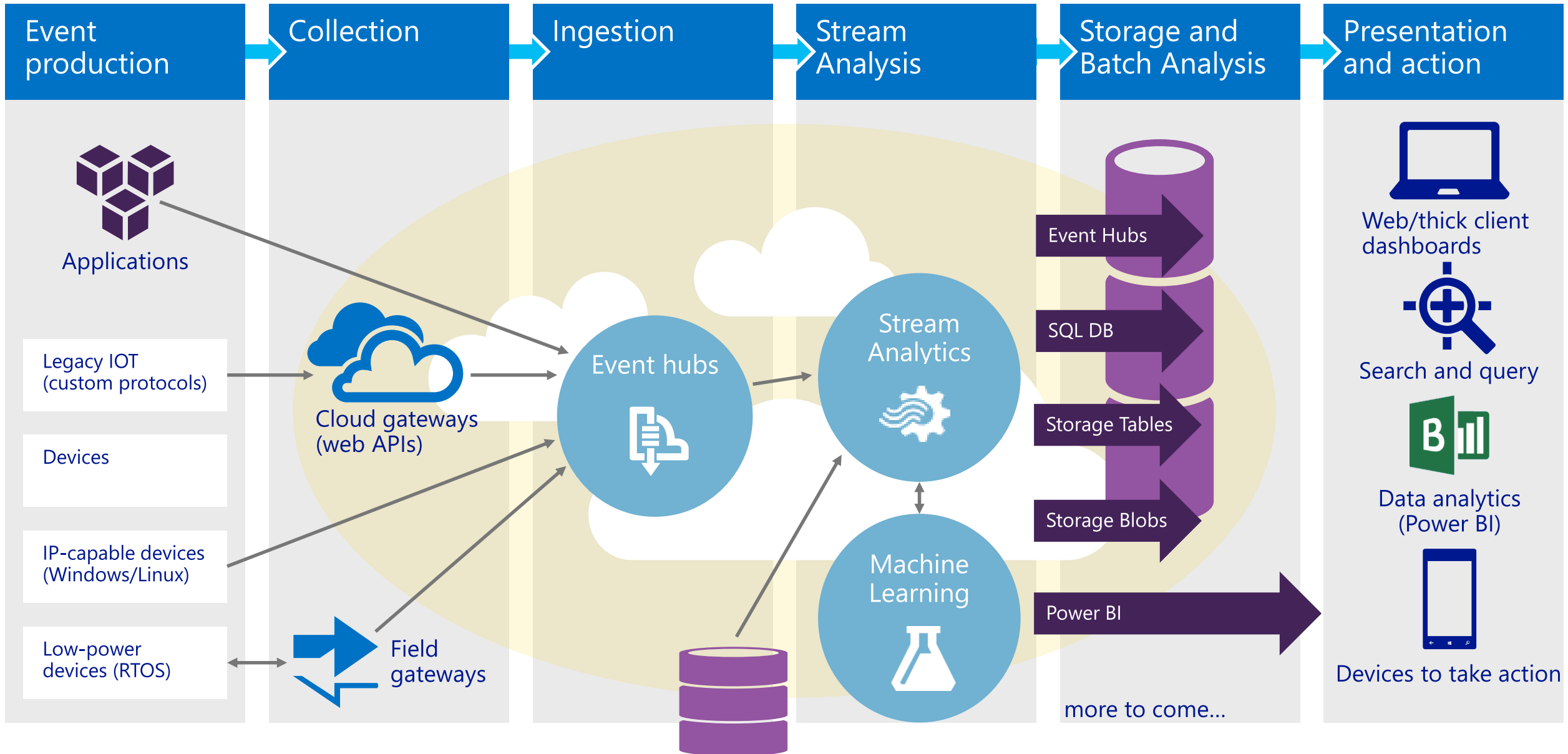
Monetization + Distribution

Full Support for Existing Code

... and backend

Microsoft Azure IoT services

Producers	Data Transport	Storage	Analysis	Presentation & action
	Event Hubs (Service Bus)	SQL Database	Machine Learning	Azure Websites
	Heterogeneous client agents	Table/Blob Storage	HD Insight/Storm	Mobile Services
	External Data Sources	DocumentDB	Stream Analytics	Notification Hubs
		External Data Sources	Cloud Services	Power BI
				External Services

Canonical Stream Analytics Pattern

DEMO

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Raspberry PI 2

Client Browser

Q & A ?

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