



The Power of One

How citizen developers are transforming IoT development

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The Internet of Things is driving digital disruption into the physical world

Improving operations and lowering costs

Creating new business models and products

Driving engagement and customer experience



IoT is revolutionizing the market and a tremendous growth opportunity

1

Unlock new revenue from existing products/service

2

Inspire new working practices or processes

3

Change or create new business model or strategy

75%

of Companies are exploring IoT

36%

Growth in sensing, communicating devices

62%

Of C-suite execs believe failure to adopt IoT will mean getting left behind

400%

Growth in Google search interest

IoT brings
incredible scale
of opportunity

Nearly 70%

Of IoT value created is in B2B
use cases¹

\$11.1 Trillion

Potential economic impact per year
(2025) for IoT²

\$1.7 Trillion

In IoT market opportunity by 2020, 5
year CAGR ~16%³

Internet of Things
technology is
transforming
business in
every aspect

INDUSTRY-SPECIFIC

IoT APPLICATIONS

PLATFORMS

DEVICES & NETWORKS





But...DATA is what will change everything

Being able to make sense out of MASSIVE amounts of real time data, both in motion as well as historical, is how disruption will happen.

Leveraging that data to do something extraordinary is the challenge...for all of us not just Data Scientists

How does an “Average Joe” become a hero?



Average Joe!!

What is a 'citizen developer'?

STAMFORD, Conn., July 14, 2011

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Gartner Says Citizen Developers Will Build at Least 25 Percent of New Business Applications by 2014

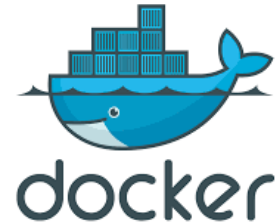
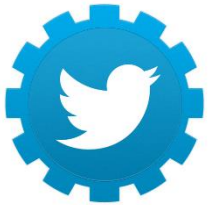
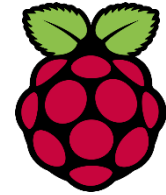
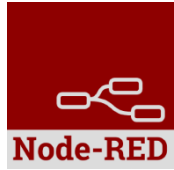
Citizen developers will be building at least a quarter of new business applications by 2014, according to Gartner, Inc. In an era of shoestring IT budgets, end users are increasingly looking outside the IT organization for application development (AD) and in many cases are building applications themselves.

Gartner defines a "citizen developer" as an end user who creates new business applications for consumption by others using development and runtime environments sanctioned by corporate IT.

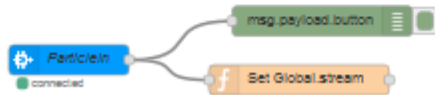
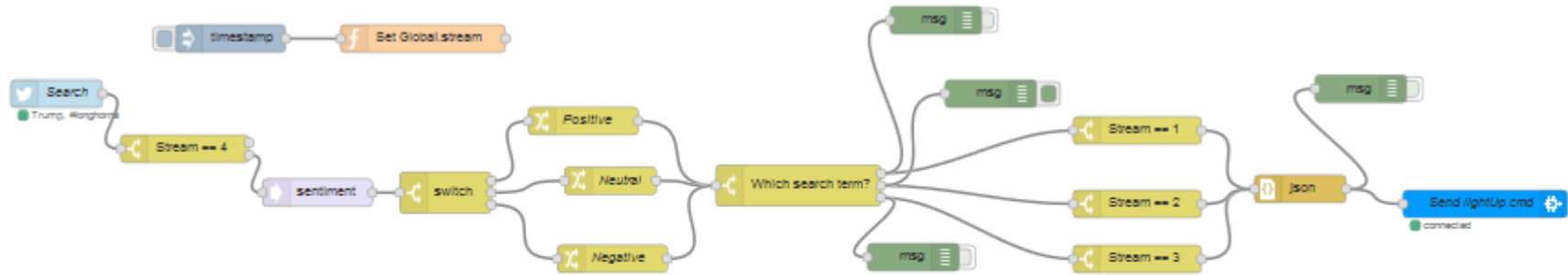
"End-user application development (EUAD) is nothing new, but the risks and opportunities it presents have become much greater

IBM Internet of Things

Today, Citizen Developers are being enabled by a plethora of IoT development resources



For Example: Capturing Twitter Sentiment in Real-Time



During the election this cheap device showed the real time stats of engagement and sentiment for both candidates. The differences were stark and very obvious any time of day or night, and pointed easily to the eventual winner.

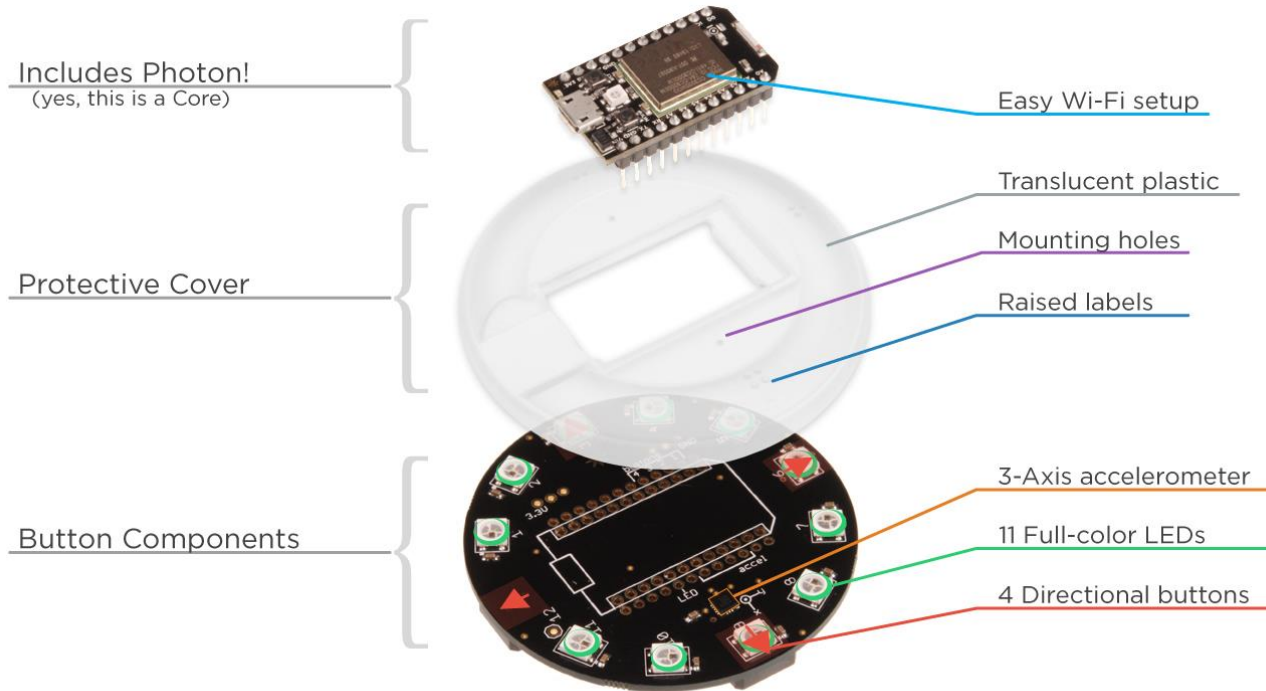


Let's step through the technologies I used

Cloudant Database

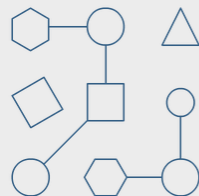
IBM Data Science Experience

Particle Internet button



- ADXL362 3-axis accelerometer
- Female socket for connection to Photon
- Additional female headers for adding extra actuators and sensors
- Particle P0 Wi-Fi module
- Broadcom BCM43362 Wi-Fi chip
- STM32F205 120Mhz ARM Cortex M3

IBM IoT Platform



Use Watson's cognitive capabilities in your IoT.

IBM Watson offers Natural Language Processing, Machine Learning, and image and text analytics to enrich IoT apps.

Use your IoT data to understand current conditions and trends, comprehend unstructured data from videos and images, and mine unstructured textual data for insights.



Connect what matters with Watson IoT Platform

Connect a broad range of IoT devices, gateways and networks to Watson IoT Platform.

Make sense of data to optimize operations, manage assets, rethink products and services, deliver insights quicker and transform the customer experience.



Managing and integrating IoT data

Quickly and easily analyze data, perform rich analytics from diverse sources and gain your own IoT data historian.

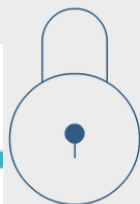
Combine IoT data with cognitive computing to extract valuable insights. Improve

Security built in by design

Watson IoT Platform offers built-in security by design.

Manage risk and gather insights across your entire IoT landscape using dashboards and sophisticated alerts.

Use blockchain technology to incorporate IoT data into business transactions.



IBM Cloud Developer



IBM Bluemix Dashboard

Search Items

All Apps (1)

Cloud Foundry Apps 1.625 GB/8 GB Used

20 Items per page | 1-1 of 1 Items

NAME	ROUTE
GGNodeJS2	GGNodeJS2.mybluemix.net

All Services (10)

Services 12/40 Used

20 Items per page | 1-10 of 10 Items

NAME	SERVICE OFFER
Continuous Delivery	Continuous Delivery
Conversation-7e	Conversation
GGIoT	Internet of Things
GGNodeJS2-cloudantNoSQLDB	Cloudant NoSQL
performance-monitoring-auto	Availability Monitoring
Push Notifications-oe	Push Notifications
Speech to Text-7z	Speech to Text
Text to Speech-a9	Text to Speech
Visual Recognition-ar	Visual Recognition
Weather Company Data for IBM Bluemix-bk	Weather Company

IBM Watson IoT Platform

[QUICKSTART](#)[SERVICE STATUS](#)

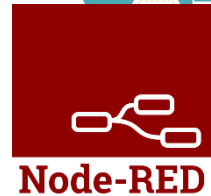
Devices

This experience will be changing soon. Want to see a preview? →

[Browse](#) | [Diagnose](#) | [Action](#) | [Device Types](#) | [Manage Schemas](#)

		Device ID	Device Type	Class ID	Date Added
Results 1-8 of 8					
		B0B448B8DF85	SensorTag	Device	Oct 8, 2016 10:31:35 AM
		GGCamPi	pi	Device	Jun 22, 2017 4:56:56 PM
		GGFAware	pi	Device	Jun 2, 2017 10:12:36 AM
		GGParticle1	Particle	Device	Sep 2, 2016 10:30:31 AM
		GGPi3Piano	pi	Device	Jan 24, 2017 3:13:52 PM
		GGPi3SenseHAT	pi	Device	Feb 19, 2017 10:11:40 AM
		GGRpi3	GGpi3	Device	Apr 18, 2016 7:09:04 PM
		GGTJBot	pi	Device	May 31, 2017 11:58:30 AM

Node-RED

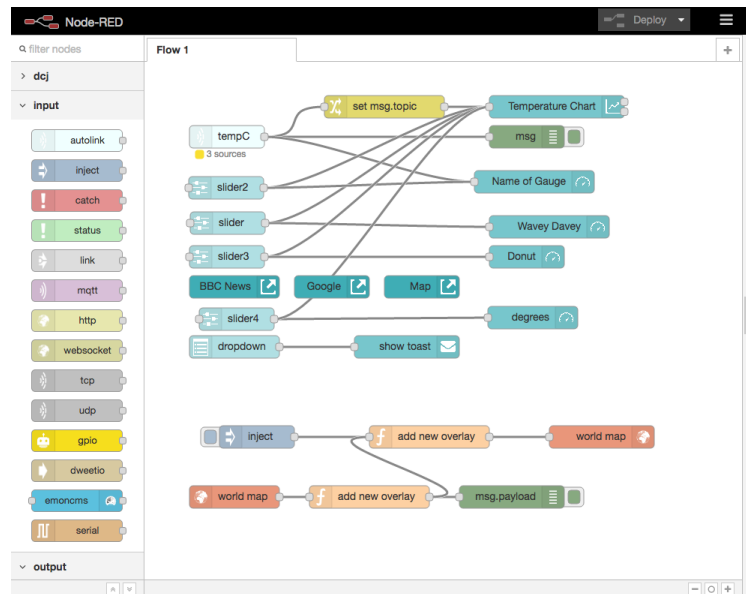


Node-RED makes it easy to wire together the Internet of Things.

It provides a browser-based drag-drop UI for creating flows of events and deploying them to the runtime.

The light-weight runtime, built in **node.js**, is ideal for edge-of-network environments or running in the cloud.

It can be easily expanded to take add new nodes to the palette – taking full advantage of the node package manager (npm) ecosystem



IBM Cloudant Database



JSON style data store with simple APIs

Flexible, fast and easy to use, can store unstructured data

Acquired by IBM in March 2014

Free & paid versions

The screenshot displays the IBM Cloudant Database web interface. On the left, a table lists documents with columns for _id, lang, payload, sentiment, and tweet. A dropdown menu is open for the first document, showing options: All Documents, Query, Permissions, Changes, and Design Documents. On the right, a detailed view of a document is shown, displaying its JSON structure. The document contains a 'key' field, a 'value' field with a 'rev' sub-field, and a 'doc' field with various metadata and a 'tweet' object.

_id	lang	payload	sentiment	tweet
000485c8ed73feb6773f7...	en	1	All Documents	
000485c8ed73feb6773f7...	en	1	Query	
00126a30d14da6118625...	en	2	Permissions	
002270d295c66605cfbb6...	en	1	Changes	
0026d9ae5c4c254fe4c1b...	en	1	Design Documents	

```
{
  "id": "000485c8ed73feb6773f7cd24f9c44d9",
  "key": "000485c8ed73feb6773f7cd24f9c44d9",
  "value": {
    "rev": "1-086e3f2785279bb33ee541574c727bfb"
  },
  "doc": {
    "_id": "000485c8ed73feb6773f7cd24f9c44d9",
    "rev": "1-086e3f2785279bb33ee541574c727bfb",
    "payload": "1",
    "lang": "en",
    "tweet": {
      "created_at": "Sat Sep 02 01:53:26 +0000 2017",
      "id": "903797987352207400",
      "id_str": "903797987352207360",
      "text": "Texas officials provide 500 free Maryland tickets to hurricane evacuees #Longhorns #NCAA #hookem #UT... https://t.co/XMEclBYd5B"
    }
  }
}
```



Let's see it in action!





[Easily connect your phone & play!](http://discover-iot.mybluemix.net/)
<http://discover-iot.mybluemix.net/>



Explore the IBM Developer Community:

<https://developer.ibm.com/code/>