

HOW TO QUICKLY CONNECT INTERNET OF THINGS DEVICES TO THE CLOUD

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AGENDA

Internet of Things (IoT) and Cloud

What is Bluemix?

- Cloud offering that includes dashboard, catalog, services, docs, runtimes, boilerplates, recipes

IoT Foundation

- powered by MessageSight technology, runs on Softlayer, stores info in Historian

MQTT protocol

Quickstart and registered devices

Cloud Foundry, Docker, VMs

Node-RED

Troubleshooting, dwAnswers forum

Real world examples

Internet of Things



- The proliferation of intelligent devices is changing the way people interact.
- A technology-enabled world is more interconnected than ever before.
- Large amounts of data from mobile devices and remote sensors are constantly being collected and transmitted.
- Creates a need for a system that can process Big Data and provide real-time analysis and response.

Many people believe with IoT the money is in sensors, but truly it is in the data and the subsequent analytics and value of that data.

SMARTER PLANET



Benefits of real-time data from Internet of Things



Monetize

- Charge for usage that is tracked by things
- Enable Pay-per-use models of things



Optimize

- Improve efficiency of activities with data from things
- Anticipate & predict optimal actions and responses



Extend

- Provide more value through connected things
- Deliver data, content, services through things



Control

- Remotely affect behavior by controlling things
- Make remote adjustments to optimize things

MY DAD SAYS
THE CLOUD IS
THE ANSWER TO
EVERYTHING,
MISS.

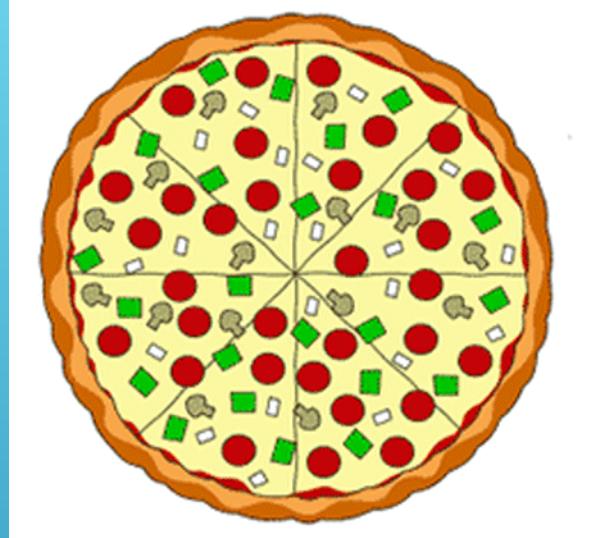
TEST
+CLOUD
+CLOUD
+CLOUD
+CLOUD

© D. Fletcher by GoodFiction.com

IBM Internet of Things Foundation is a cloud offering that allows Internet-connected devices to be integrated directly into Bluemix solutions. Bluemix is IBM's PaaS offering. What is Paas?

First, let's discuss the difference between On-Premix, IaaS, PaaS and SaaS.

My husband says pizza is the answer to everything



Using “pizza-as-a-service” analogy:

- **On Premise** = you buy everything and make the pizza at home
- **IaaS** = take and bake (pick up the pizza, you cook it at home)
- **PaaS** = pizza delivered
- **SaaS** = dining in the restaurant

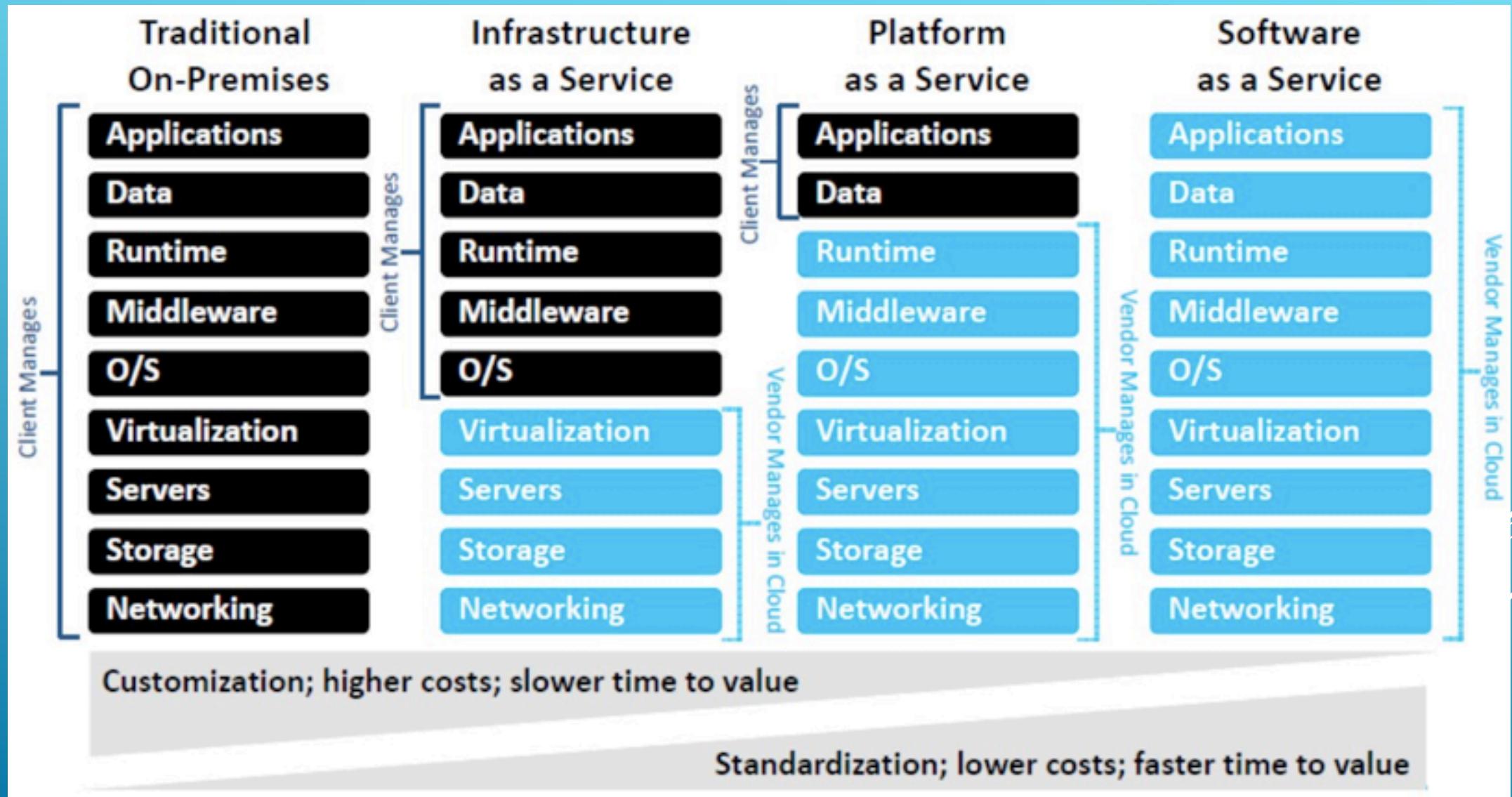
On Premise = your business handles everything, provisioning hardware, software,

IaaS = the infrastructure, storage, networks, other fundamental resources are provided and you manage the software and your applications.

PaaS = the hardware (cloud environment), software and runtimes are provided for you but you manage your own applications

SaaS = everything is provided by another party and you use their software service







Bluemix Dedicated: For hybrid cloud applications

Bluemix Dedicated provides additional isolation for your sensitive data while leveraging public Bluemix services. Using your most sensitive data, you can build and run apps in Bluemix Dedicated, as well as pull in services from IBM's public Bluemix catalog

Bluemix is an integrated hybrid cloud platform

Choose the right combination of integrated development and deployment models to drive pervasive digital innovation and acceleration across apps and workloads of all types.



Public

Scale your apps with endless choice and flexibility. IBM has more than 40 cloud data centers globally and we're rolling Bluemix out across them, with Dallas and London open today.

Dedicated

An unrivaled approach to blending cloud speed and scale with enhanced security and control. Bluemix is in your own SoftLayer private cloud, one that's securely connected to both the public Bluemix and your own network.

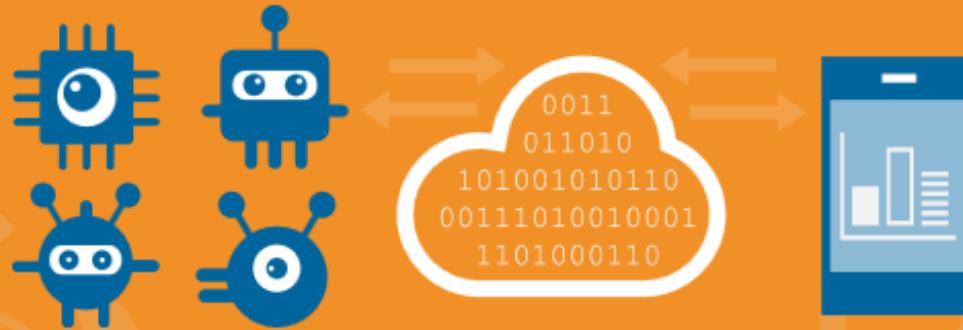
Local

Bring cloud agility to even the most sensitive workloads in your data center. Bluemix Local is delivered behind the firewall, but as a fully managed service so you can continue to focus on apps, not infrastructure.

*Coming Summer 2015**

New Hybrid Cloud Provides the Path Forward





IBM Internet of Things Foundation (IoT Foundation)

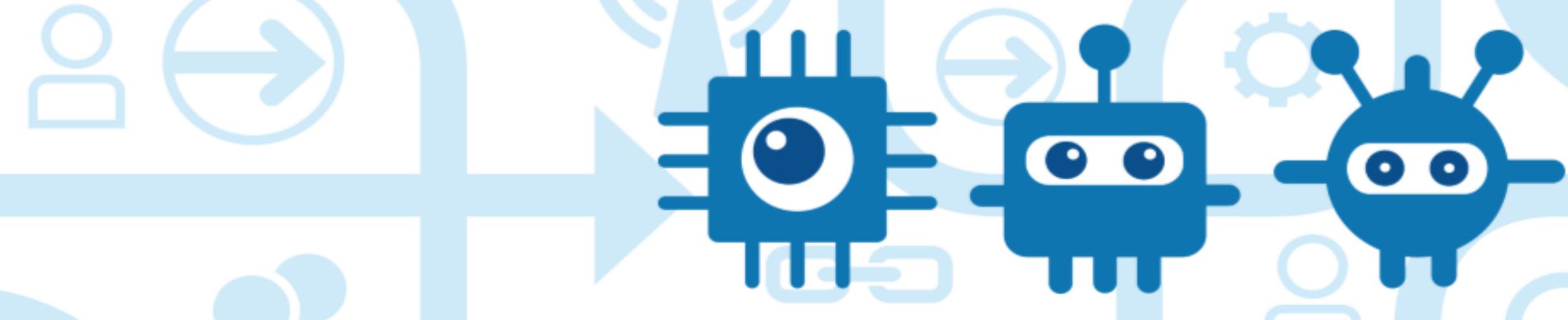
A fully managed, cloud-hosted service that is designed to simplify and derive the value from your IoT devices. Check the capabilities list to see the key features. Internet of Things Foundation is available through Bluemix and the IBM Marketplace. Try it out with a free 30 day trial.

- Device registration
- Device and application connectivity
- Securely receiving data and sending commands to devices
- Storage and access to historic data

[Sign up](#)

Internet of Things on Bluemix

Rapidly compose and extend apps that take advantage of data and analytics from your connected devices and sensors.



Sign up for a free trial at: ibm.biz/rtpcloud



IBM Bluemix™

Develop your apps: from concept to live in minutes.

Scale your app: for your tenth or millionth user.

Leverage cloud services: for your next big idea.

Begin your free trial

Create an IBM id to get started.

[Already have an IBM id?](#)

Asterisk (*) denotes required field.

*Primary email address**

*Re-enter email address**

*First name**

*Last name**

*Create password**

*Re-enter password**

*Phone number**



Category

- Watson
- Mobile
- DevOps
- Web and Application
- Integration
- Data Management
- Big Data
- Security
- Business Analytics
- Internet of Things

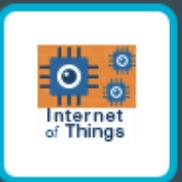
Support

- IBM
- Third Party
- Community
- Experimental
- Beta

Starters // Choose a package of sample code and services, or start from scratch

Boilerplates

Get started with a new app, now



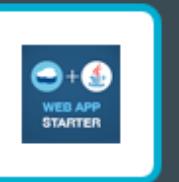
Internet of Things Fou...

IBM



Java Cache Web Starter

IBM



Java Cloudant Web St...

IBM



Java DB Web Starter

IBM



Mobile Cloud

IBM



MobileFirst Services S...

IBM



Node.js Cache Web S...

IBM



Node.js Cloudant DB ...

IBM



User Modeling Java W...

IBM



User Modeling Node.j...

IBM



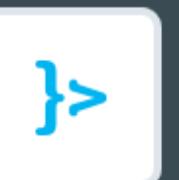
User Modeling Ruby ...

IBM



Node-RED Starter

Community



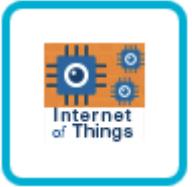
Vaadin Rich Web Starter

Community



WordPress On Bluemix

Experimental



Internet of Things Foundation Starter

IBM

Get started with an Internet of Things Foundation application using Node-RED in Bluemix. Try the sample flow with a simulator and customize it for your own devices.

VERSION
0.4.14

TYPE
Boilerplate

[VIEW DOCS](#)



SDK for Node.j...



Cloudant NoS...

This runtime hosts the Node-RED application that runs the flow including Internet of Things Foundation nodes. We use Node-RED so you can quickly get started with Internet of Things Foundation in Bluemix. Powered by SDK for Node.js™

[VIEW DOCS](#)

Pick a plan

Monthly prices shown are for country or region: [United Kingdom](#)

Plan	Features	Price
✓ Default	Run one or more apps free for 30 days (375 GB-hours free).	£0.0424 GBP/GB-Hour



This is a service plan for the IBM Bluemix Platform runtime.

[TERMS](#)

Create an app:

Space:

valeriel

Name:

Enter new app name

Host:

Enter host

Domain:

mybluemix.net

Selected Plans:

SDK for Node.js™

Default

Cloudant NoSQL DB

Shared

[CREATE](#)



Category

- Watson
- Mobile
- DevOps
- Web and Application
- Integration
- Data Management
- Big Data
- Security
- Business Analytics
- Internet of Things

Support

- IBM
- Third Party
- Community
- Experimental
- Beta

Runtimes

Run an app in the language of your choice



Liberty for Java™
IBM



SDK for Node.js™
IBM



.go
Go
Community



.php
PHP
Community



.py
Python
Community



Ruby on Rails
Community



Ruby Sinatra
Community



Bring Your Buildpack
Community

Services // The building blocks of any great app

Watson

Build cognitive apps that help enhance, scale, and accelerate human expertise



Concept Expansion
IBM BETA



Concept Insights
IBM BETA



Language Identification
IBM BETA



Machine Translation
IBM BETA



Message Resonance
IBM BETA



Question and Answer



Relationship Extraction



Speech To Text



Text to Speech



Tradeoff Analytics

Use other Bluemix services to extend your app to start creating a great Internet of Things app.

Here are some of the services you could utilise:



Twilio
Third Party



Cloudant NoSQL
DB
IBM



Dash DB
IBM



Geospatial
Analytics
IBM



Time Series
Database
IBM



IBM Analytics for
Hadoop
IBM



Leverage the power of Docker to deploy a container on Bluemix using the IBM Containers service

Integration

Extend existing investments and infrastructure



Cloud Integration

IBM



Containers

View More



Install Docker on your operating system following [the installation guides](#) if you do not have it already.



Download the [IBM Containers extension](#) to add additional capabilities to optimize the container service.

<https://developer.ibm.com/bluemix/2014/12/04/ibm-containers-beta-docker/>

Build your apps, your way.

Instant Runtimes

App-centric runtime environments based on Cloud Foundry.



[View Docs for runtimes](#)

Containers

Portable and consistent delivery of your app without having to manage an OS.



[View Docs for containers](#)

Virtual Machines

Get the most flexibility and control over your environment with VMs.



[View Docs for VMs](#)

Internet of Things

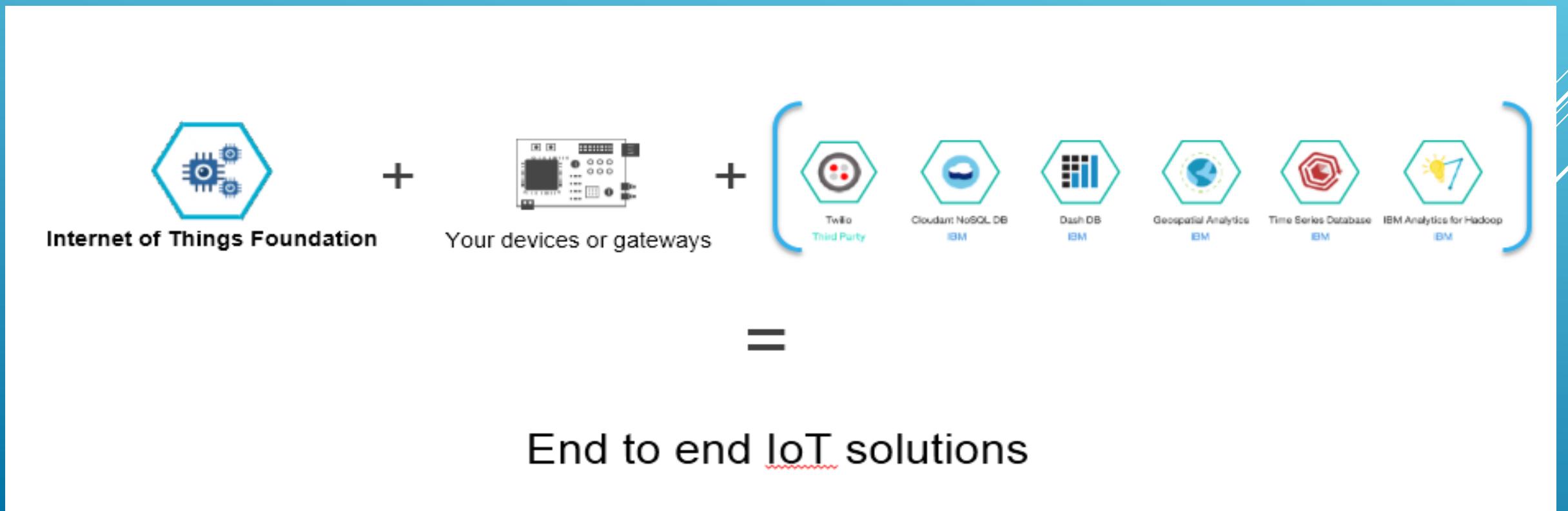
A new generation of
applications



Internet of Things

IBM

Bluemix allows you to integrate your IoT devices and applications with other Bluemix services for a complete IoT solution





Internet of Things

IBM

PUBLISH DATE
12/5/2014

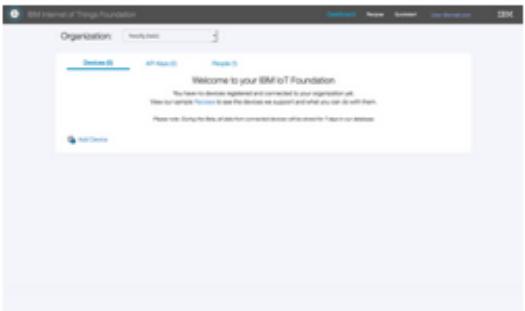
TYPE
Service

[VIEW DOCS](#)

Internet of Things Foundation provides simple but powerful application access to IoT devices and data.

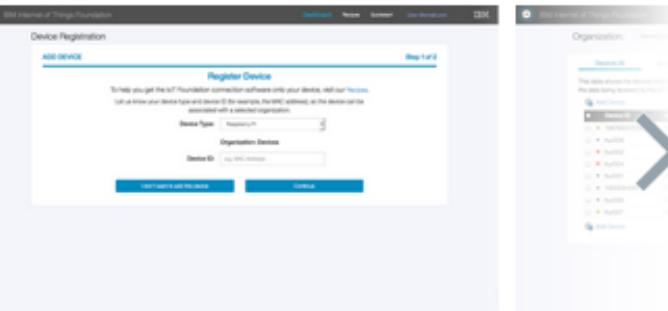
- **Device Registration**

Register your devices, securely receive data and send commands to those devices. Additionally you can access historic device data.



- **Integrated Applications**

Rapidly compose analytics applications, visualisation dashboards, mobile IoT apps, and applications that can feed your backend enterprise applications.



Add Service

Space:

Select a space

App:

Select an app

Service name:

Internet of Things-el

Selected Plan:

Free

[CREATE](#)



Internet of Things

Free

- Includes up to 20 active devices, 100MB of data traffic and 1GB of storage
- Maximum of 20 active devices
- Maximum of 100MB data exchanged
- Maximum of 1GB data storage (with 30 day expiry)
- Maximum of 10 application bindings

Free

Pick a plan

Monthly prices shown are for country or region: [United States](#)

Plan	Features	Price
✓ Free	Includes up to 20 active devices, 100MB of data traffic and 1GB of storage Maximum of 20 active devices Maximum of 100MB data exchanged Maximum of 1GB data storage (with 30 day expiry) Maximum of 10 application bindings	Free
<p> The Free service plan for Internet of Things Foundation includes up to 20 active devices, 100MB of data traffic and 1GB of online data storage per month.</p>		
Bronze	Includes up to 100 active devices, 100MB of data traffic and 1GB of storage Charge per device thereafter Charge per MB data exchanged thereafter Charge per GB data stored online thereafter	\$20.00 USD/Instance \$0.20 USD/Active Device \$0.01 USD/Megabytes Exchanged \$1.00 USD/Gigabyte Month
Silver	Includes up to 3000 active devices, 100MB of data traffic and 1GB of storage Charge per device thereafter Charge per MB data exchanged thereafter Charge per GB data stored online thereafter	\$120.00 USD/Instance \$0.04 USD/Active Device \$0.01 USD/Megabytes Exchanged \$1.00 USD/Gigabyte Month
Gold	Includes up to 15000 active devices, 100MB of data traffic and 1GB of storage Charge per device thereafter Charge per MB data exchanged thereafter Charge per GB data stored online thereafter	\$450.00 USD/Instance \$0.03 USD/Active Device \$0.01 USD/Megabytes Exchanged \$1.00 USD/Gigabyte Month

 [Internet of Things Foundation](#)

Registering devices to the Internet of Things Foundation

Creating applications with Node-RED for Bluemix

IOT SAMPLES

Visualizing your data

ADDING SERVICES

IBM Analytics for Hadoop Integration

Mobile Application Security and Push Integration

DASHBOARD**CATALOG**

Type to search

Getting started with Internet of Things Foundation

Last Updated: 2/12/2015

**TUTORIALS AND SAMPLES**

[Internet of Things Starter](#)

[Device connection recipes](#)

[IoT device simulator QuickStart example](#)

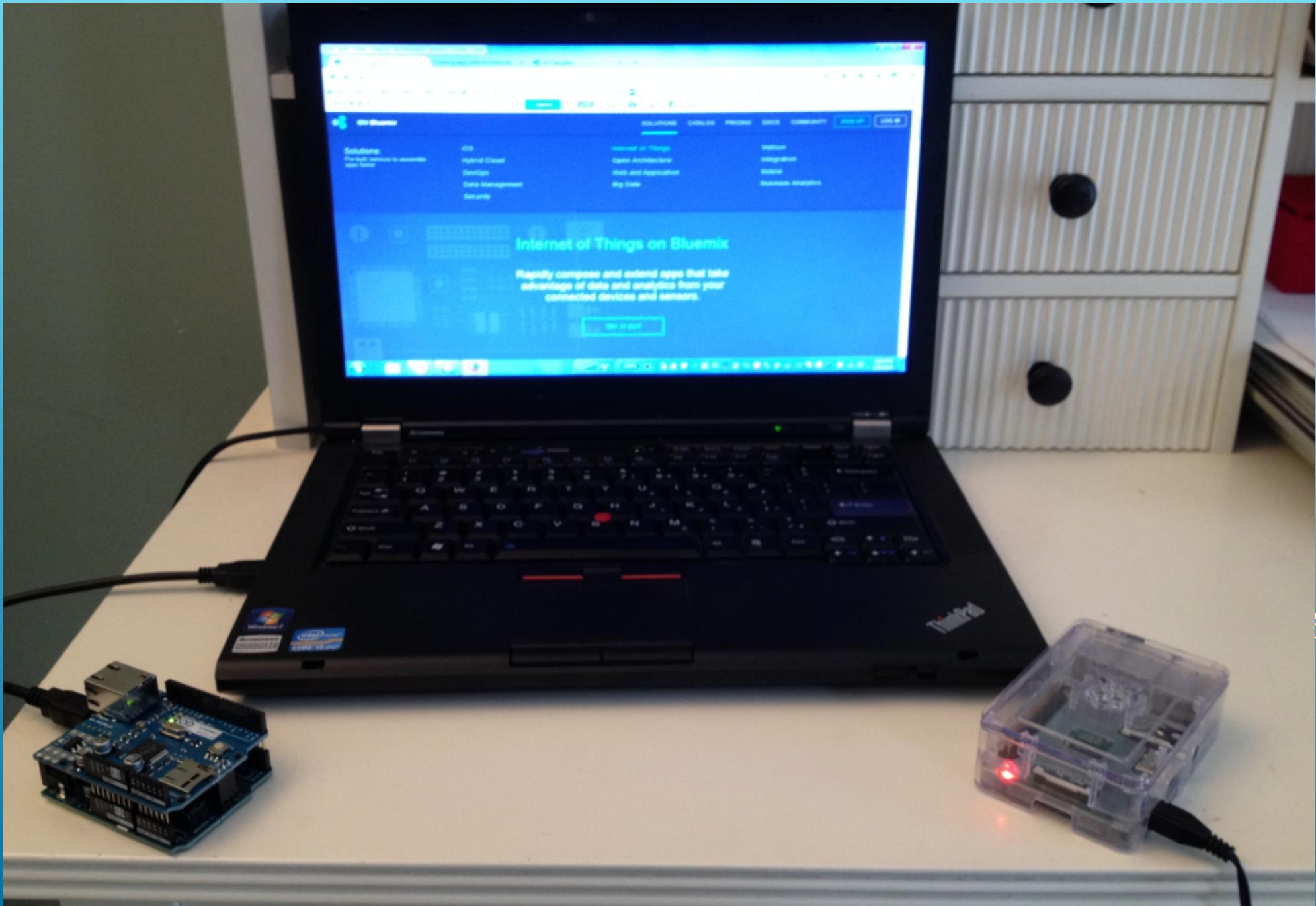
IBM® Internet of Things Foundation (IoTF) in Bluemix™ provides simple yet powerful application access to Internet of Things (IoT) devices and data.

When connecting to the QuickStart service no authentication (or registration) is required

A Device must be registered before it can connect and authenticates using a client ID in the format: d:org_id:device_type:device_id

An Application authenticates using a client ID in the format: a:org_id:app_id





Ready to connect a device or create an app?

Search our device or app recipes below to find a guide that suits you:

model...

Or

Simulate a device

Can't find device?

<p>Intel Galileo Intel Galileo Use an Intel® Galileo to connect to the IBM Internet of Things Foundation. Then you can visualize the...</p>	<p>MultiTech MultiConnect Conduit MultiConnect Conduit This recipe has been provided by an IBM Business Partner Use a MultiConnect Conduit to connect any serial...</p>	<p>ARM ARM® mbed™ LPC1768 ARM mbed Use an mbed microcontroller to connect to the IBM Internet of Things Foundation. Then you can visualize the...</p>	<p>Arduino Uno Arduino Uno Connect your Arduino Uno device to the IBM Internet of Things Foundation. Ingredients Hardware Requirements • Arduino Uno...</p>
<p>Device</p>	<p>Device</p>	<p>Device</p>	<p>Device</p>
<p>Texas Instruments Energia with TM4C1294 Connected LaunchPad Texas Instruments Energia with TM4C1294 Connected LaunchPad Use the Energia Rapid Prototyping Environment, available for a wide range of Texas...</p>	<p>Texas Instruments Energia with MSP430F5529 LaunchPad + SimpleLink™ Wi-Fi® CC3100 BoosterPack Texas Instruments Energia with MSP430F5529 LaunchPad + SimpleLink™ Wi-Fi® CC3100 BoosterPack Use the Energia Rapid Prototyping Environment, available for a...</p>	<p>Texas Instruments Energia with SimpleLink™ Wi-Fi® CC3200 LaunchPad Texas Instruments Energia with SimpleLink Wi-Fi CC3200 LaunchPad Use the Energia Rapid Prototyping Environment, available for a wide range of...</p>	<p>Texas Instruments SimpleLink™ Wi-Fi® CC3200 LaunchPad SimpleLink™ Wi-Fi® CC3200 LaunchPad Use a SimpleLink™ Wi-Fi® CC3200 LaunchPad to connect to the IBM Internet of Things Foundation and...</p>
<p>Device</p>	<p>Device</p>	<p>Device</p>	<p>Device</p>
<p>Device Simulator Device Simulator If you don't have a physical device but still want to sample the IBM Internet of Things Foundation,...</p>	<p>Connect to Quickstart Connect to Quickstart You have a different type of device? We might not have a recipe ready for you, however,...</p>	<p>Texas Instruments BeagleBone with SensorTag BeagleBone with SensorTag Use a BeagleBone Black board to connect a TI SensorTag to the IBM Internet of Things Foundation....</p>	<p>Intel Intel Gateway Solutions Intel® Gateway Solutions for the IoT This recipe has been provided by an IBM Business Partner Use an Intel® Gateway...</p>
<p>Device</p>	<p>Device</p>	<p>Device</p>	<p>Device</p>
<p>Connect Registered Devices Connect Registered Devices You have a different type of device? A recipe might not be available yet, however, you can...</p>	<p>ARM ARM® mbed™ Ethernet Starter Kit ARM® mbed™ IoT Starter Kit Use an ARM® mbed™ IoT Starter Kit, Ethernet edition for IBM Internet of Things Foundation,...</p>	<p>Receive Commands Receive commands This recipe will help you add code to your device so that it can receive and process commands...</p>	<p>Raspberry Pi Raspberry Pi Use a Raspberry Pi to connect to the IBM Internet of Things Foundation. Then you can visualize the...</p>

Recipe Types

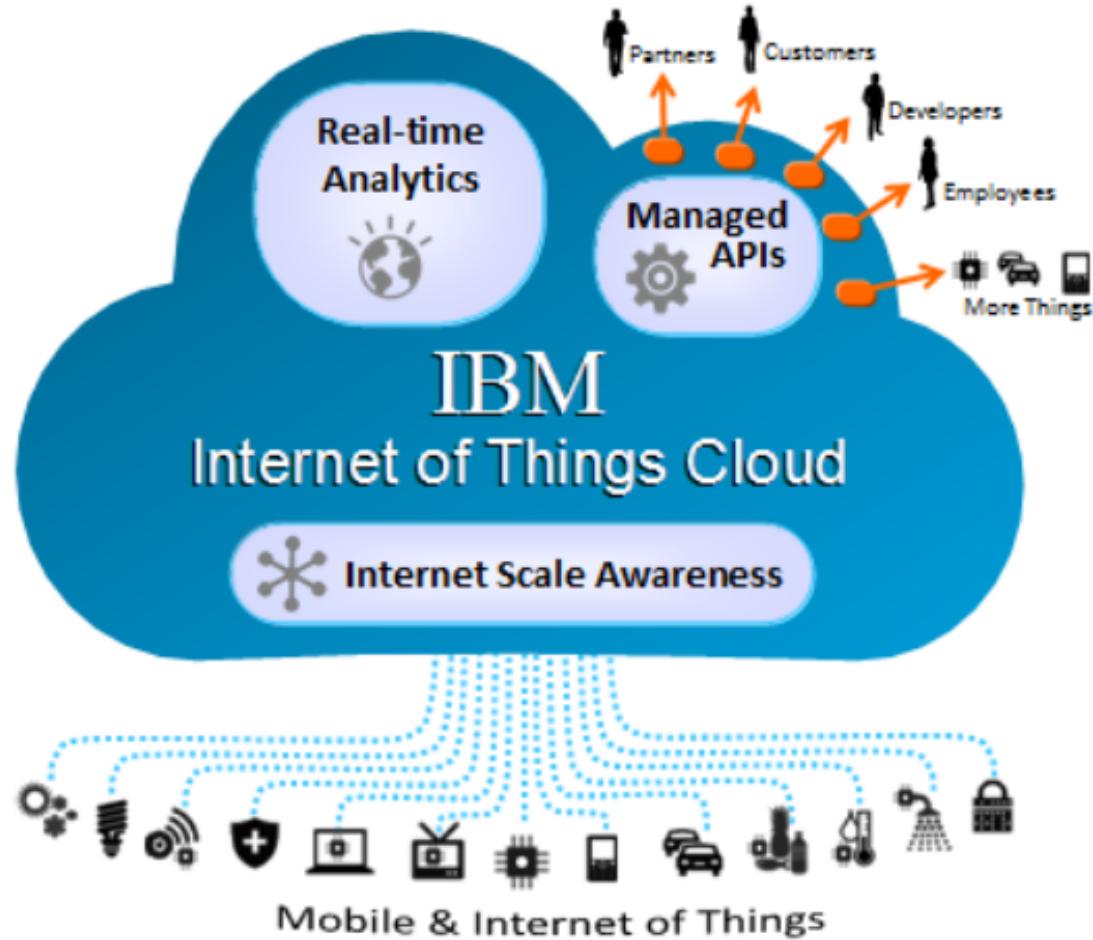


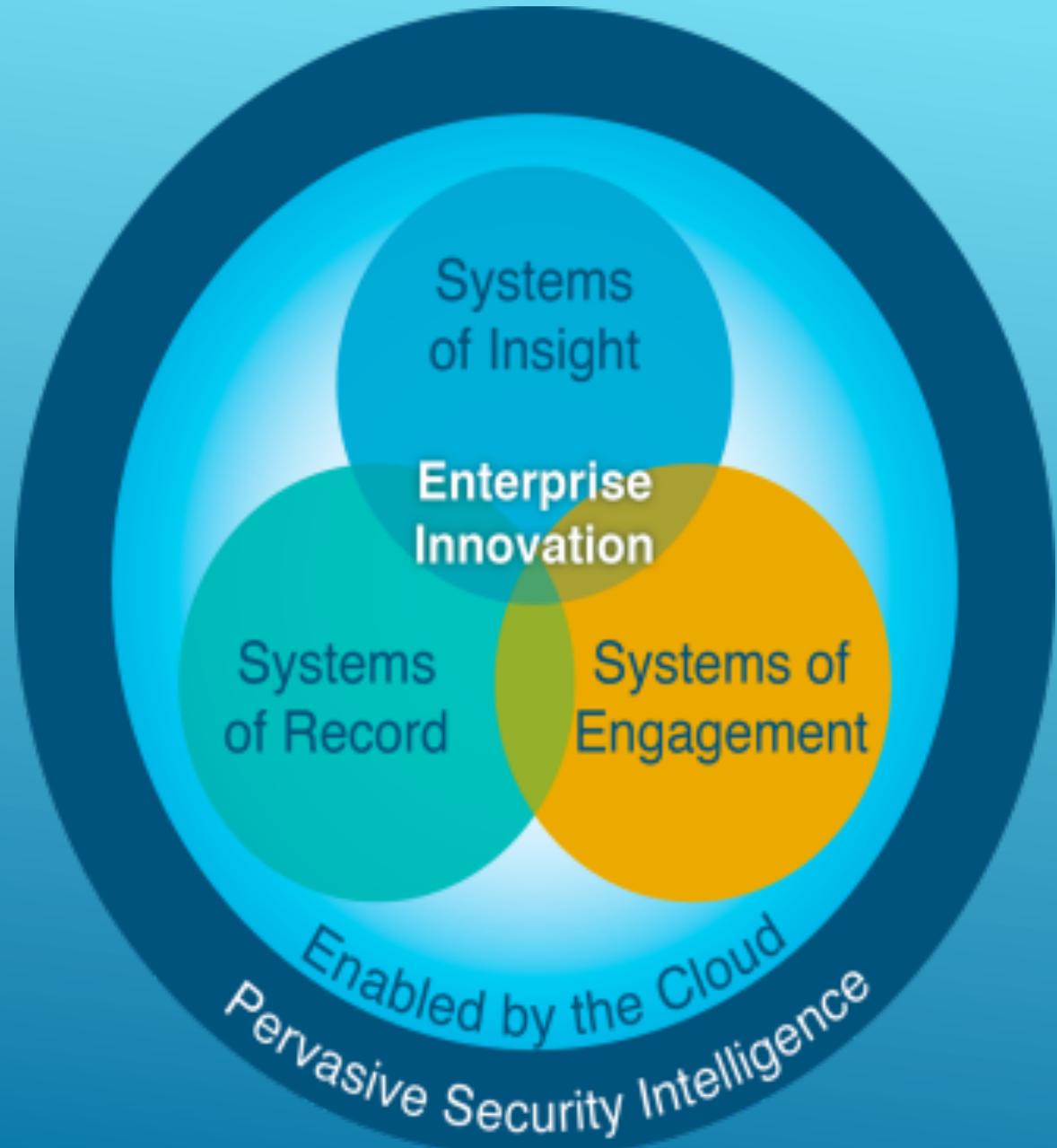
Recipes come in different shapes and sizes

- **Building block recipes:**
 - How to connect a specific device to Internet of Things (SensorTag, Car, Building, Train, etc.)
 - How to capture a specific type of data (e.g. motion, temperature etc.)
 - How to create IoT apps in Bluemix IoT cloud
 - How to turn a Thing into an API
- **Integration / Composition recipes**
 - How to get one component / service to work with another component /service
 - How to connect two or more specific endpoints
 - For instance: how to consume an event from the IoT Bluemix service and send as a notification to a phone using the MBaaS Push Bluemix service
 - For instance: how to store a sensor event in a no SQL data store
- **Solution / use case / project recipes**
 - May build on multiple building block recipes.
 - For instance: How to send a notification to a smart phone when a sensortag shakes violently

Simple Connectivity for Mobile & Internet of Things

1. Register and connect device
2. Define data & command interfaces to device
3. Collect real-time data, run analytics, detect events
4. Apply big data mgmt, time series querying, geo-spatial data, archiving
5. Remotely manage and control devices





IoT Foundation enables you to:

- **Connect:** Securely connect things to your applications
- **Collect:** Collect and manage a time-series view of data from things
- **Assemble:** Visually assemble flows to process your data with [Node-Red](#) and Bluemix
- **Manage:** Manage connections and subscriptions with a highly scalable service

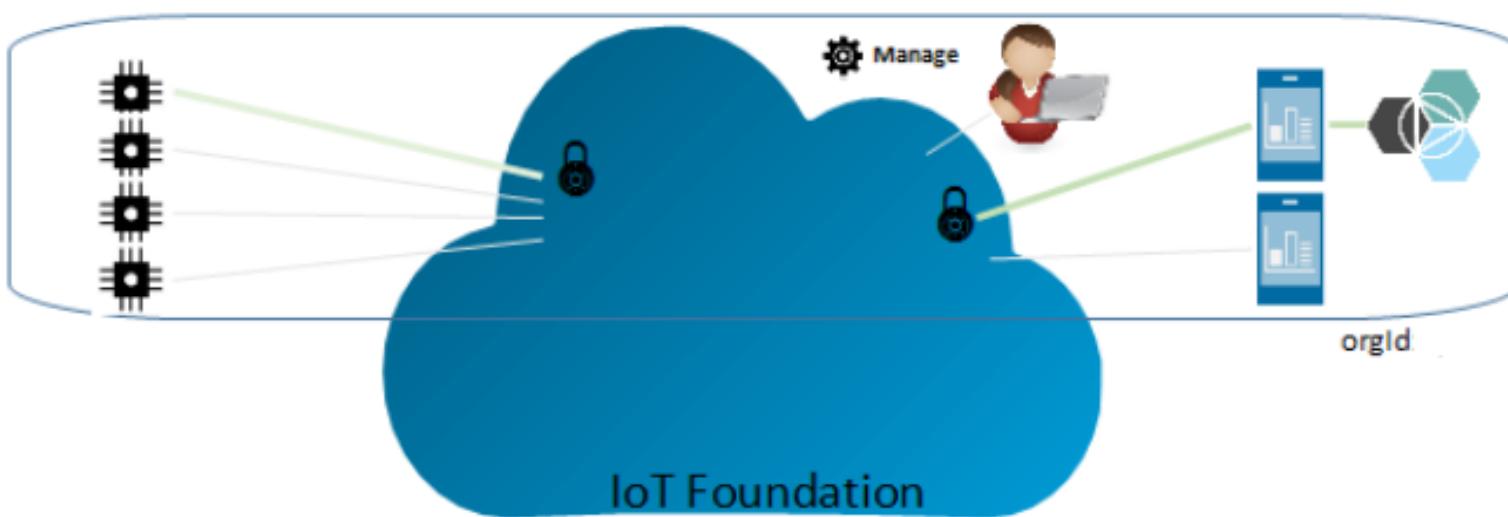
SECURITY: SSL/TLS



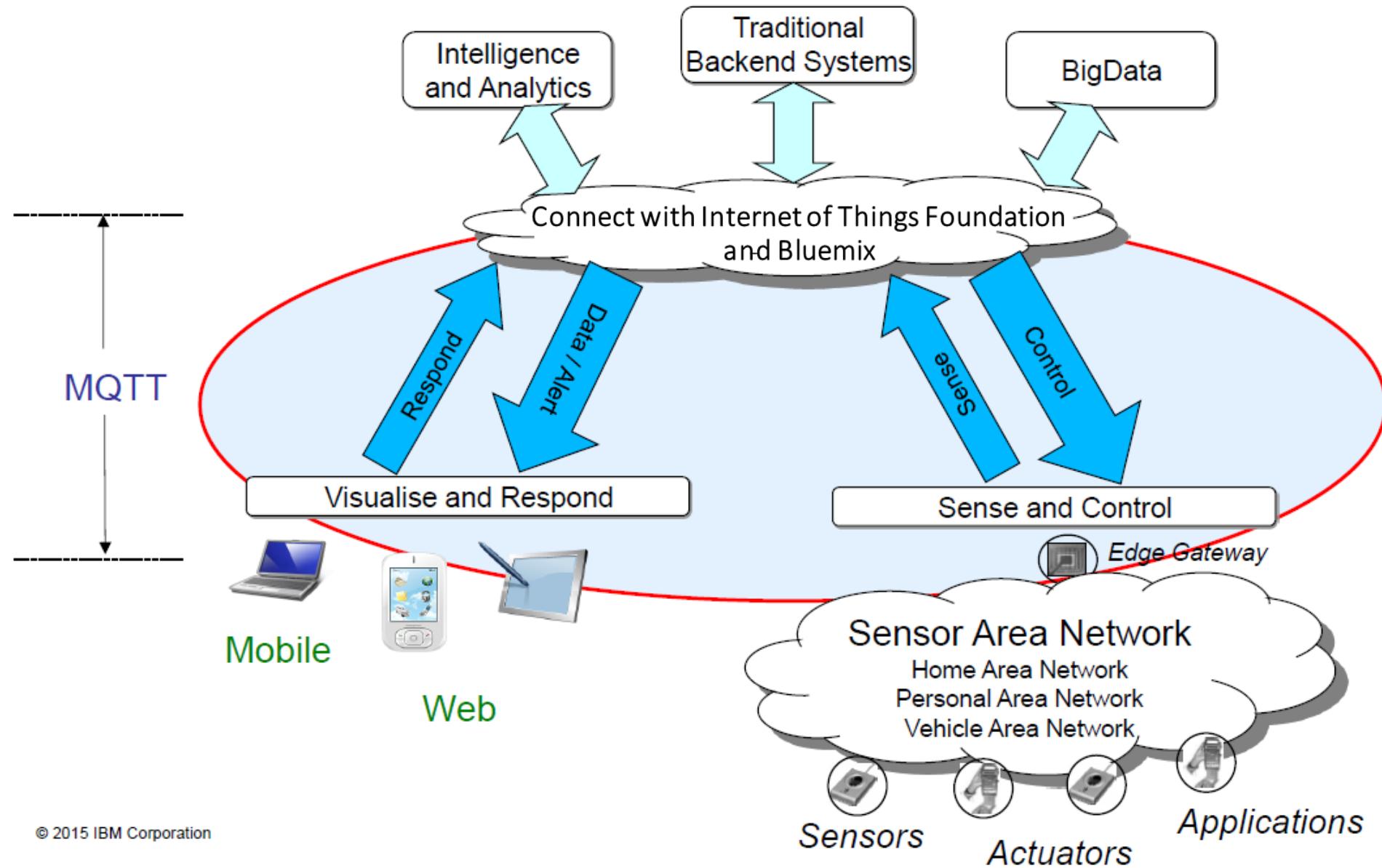
IOT Foundation supports TLS v1.2 with AES 128 ciphers

How do we ensure your devices connect securely to the IoT Foundation?

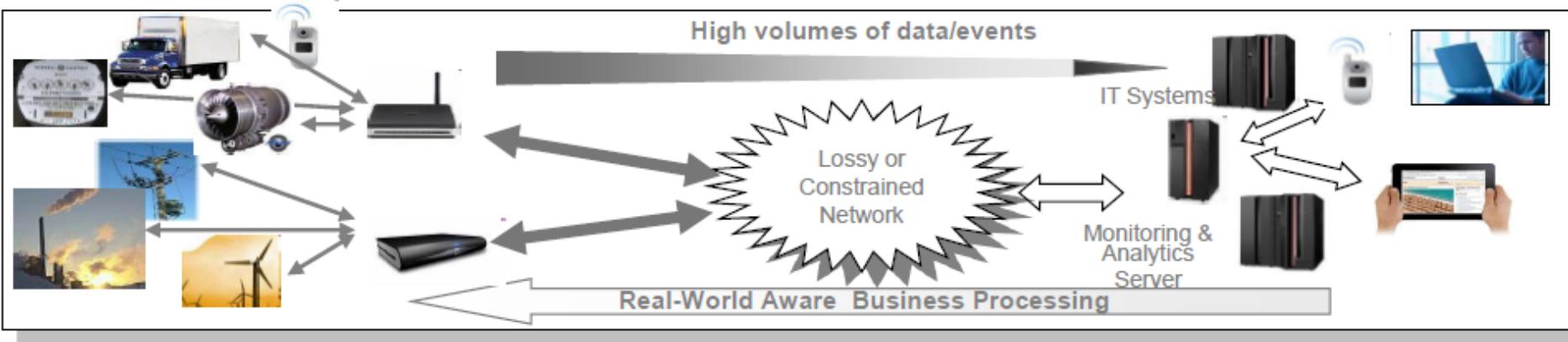
- Devices connect through a unique combination of clientId and authentication token that only you know.
- Full support for connectivity over TLS (v1.2) is provided.
- Open standards are used (MQTT v3.1.1) to allow easy interop across many platforms and languages.



MQTT – Wide Area Network protocol for Internet of Things



MQTT is a lightweight publish/subscribe protocol with reliable bi-directional message delivery



In this arena, open source and standards are essential



2015 - MQTT 3.1.1 Standard
is Ratified

Axway, BlackBerry, Cimetrics, Cisco,
Cognizant, dc-Square, Eclipse,
Emerson, Eurotech, IBM, Kaazing,
M2MI, Red Hat, Solace, Software
AG, Telit, TIBCO, VMware, WSO2



Evolution of an open technology

MQTT VERSION 3.1.1 WAS RATIFIED AS OASIS STANDARD

MQTT Protocol

- MQ Telemetry Transport (MQTT) is a simple publish/subscribe lightweight messaging protocol.
- It is open source and royalty-free, allowing easy adaptation for a wide variety of devices.
- Ideal for constrained environments where network bandwidth is low and when remote devices may have limited processing capability.
- Eclipse Paho Project: a collaboration of IBM, Eurotech and other entities to provide open source tools and protocols as part of project to simplify development of Machine to Machine (M2M) solutions.
- OASIS® MQTT Technical Committee: In 2013, an OASIS technical committee was formed to produce a standard for MQTT with requirements for enhancements, documented usage examples and best practices.

More information available at these websites:

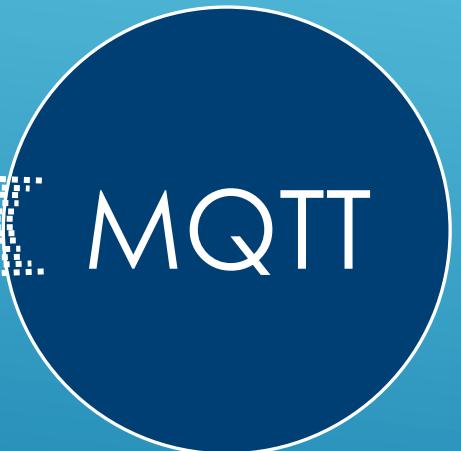
www.eclipse.org/paho/

www.mqtt.org

www.oasis-open.org/committees/tc_home.php?wg_abbrev=matt



RELIABLY AND QUICKLY DELIVER IOT DATA WITH MQTT



Open

Lean

Simple

Reliable

Open royalty-free spec
Wide variety of clients and servers

- Hobbyist to enterprise
- Open source to commercial

Minimized on-the-wire format

- Smallest packet size 2 bytes
- Scalable
- Low footprint
- Clients: C=30Kb; Java=100Kb

Minimal pub/sub messaging semantics

- Asynchronous ("push") delivery
- Simple set of verbs -- connect, publish, subscribe and disconnect

Three qualities of service

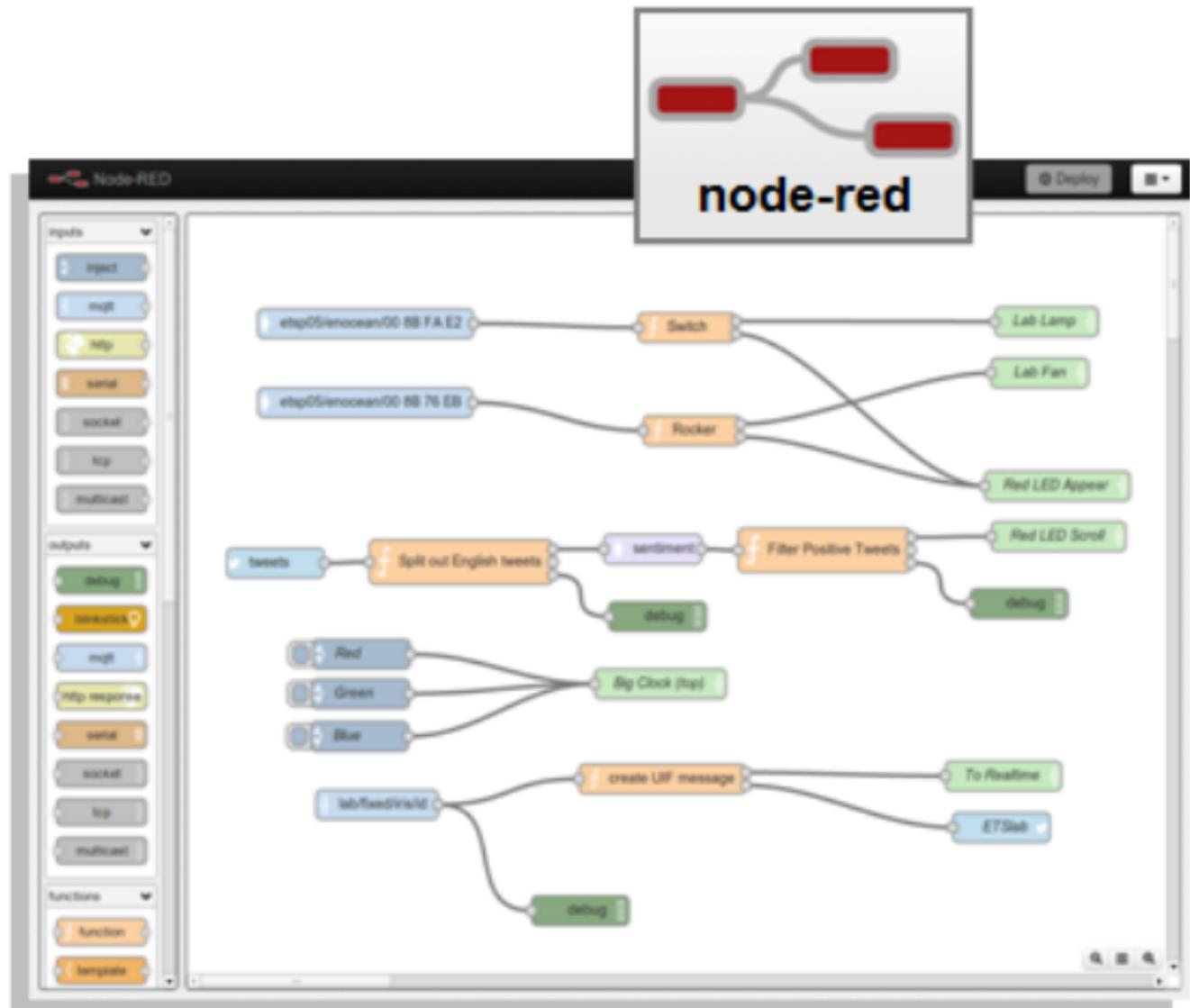
- 0 – at most once delivery
 - 1 – assured delivery dups ok
 - 2 – once and once only delivery
- Copes with loss of contact between client and server.
- "Last will and testament" to publish a message if the client goes offline.

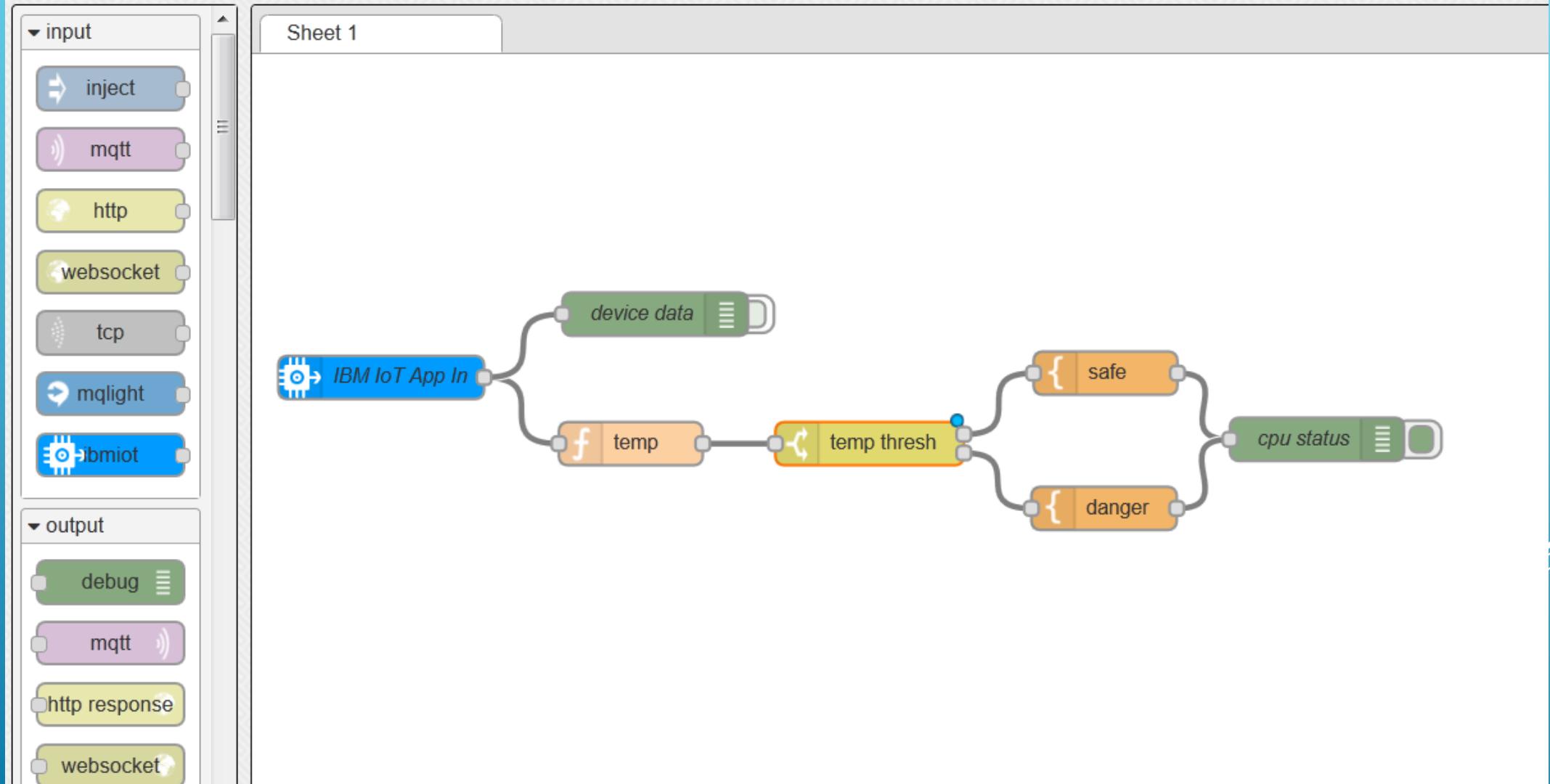


Easy automation without coding

Rapidly wire devices together and create logic

- Visual tool for wiring Mobile, Social and Internet of Things
- Deploy with just one click
- Simple API to create nodes with lines of JavaScript or HTML
- Share flows in JSON format
- Based on Node.js for event-driven, non-blocking I/O
- Download from <http://github.com/node-red>





SCALING

The image shows the IBM Bluemix dashboard for the application `iotf-starter2`. The dashboard includes the following sections:

- Left Sidebar:** Contains links for `Back to Dashboard`, `Overview`, `SDK for Node.js™`, `Files and Logs`, `Environment Variables`, `Start Coding`, and `SERVICES` (Cloudant NoSQL DB, Internet of Things).
- App Overview:** Displays the app icon (blue square with white rocket), name `iotf-starter2`, and routes `iotf-starter2.mybluemix.net`.
- Scaling Section:** Shows `INSTANCES: 1`, `MEMORY QUOTA: 512` (512 per instance), and `AVAILABLE MEMORY: 250.750 GB`. Buttons for `SAVE` and `RESET` are present.
- App Health:** Shows the app is running with a green checkmark. Buttons for `RESTART` and `STOP` are available.
- Activity Log:** A table listing recent events:

Date	User	Action
2/9/15 1:23 PM	vlampkin@us.ibm.com	started iotf-starter2 app
2/9/15 1:22 PM	vlampkin@us.ibm.com	stopped iotf-starter2 app
2/9/15 1:19 PM	vlampkin@us.ibm.com	started iotf-starter2 app



iotf-starter2

Routes: iotf-starter2.mybluemix.net

INSTANCES:

1

MEMORY QUOTA:

512

AVAILABLE MEMORY:

250.750
GB

SAVE

RESET

ADD GIT



APP HEALTH

RESTART

Your app is running.

STOP

ACTIVITY LOG

3/8/15
2:51 PMiotf-starter2
an instance of the app
crashed. Not enoughSDK FOR
NODE.JS™

ADD A SERVICE OR API



iotf-starter2

Routes: iotf-starter2.mybluemix.netGIT URL: <https://hub.jazz.net/git/vlampkin/iotf-starter2>

EDIT CODE

Internet of
ThingsSDK FOR
NODE.JS™

INSTANCES:

1

MEMORY QUOTA:

512

AVAILABLE MEMORY:

250.750
GB

SAVE

RESET

APP HEALTH

RESTART

Your app is running.

STOP

ACTIVITY LOG



vlampkin | iotf-starter2 Root/vlampkin | iotf-starter2 EDIT CODE TRACK & PLAN BUILD & DEPLOY

File Edit View FORK Create new launch configuration ▶ ▶ ▶ ▶ ▶ ▶

▼ vclampkin | iotf-starter2

- ▶ .git
- ▶ defaults
- ▶ launchConfigurations
- ▶ nodes
- ▶ public
- ▶ .cignore
- ▶ .gitignore
- ▶ bluemix-settings.js
- ▶ couchstorage.js
- ▶ License.txt
- ▶ manifest.yml
- ▶ mongostorage.js
- ▶ package.json
- ▶ project.json
- ▶ README.md

▶ README.md

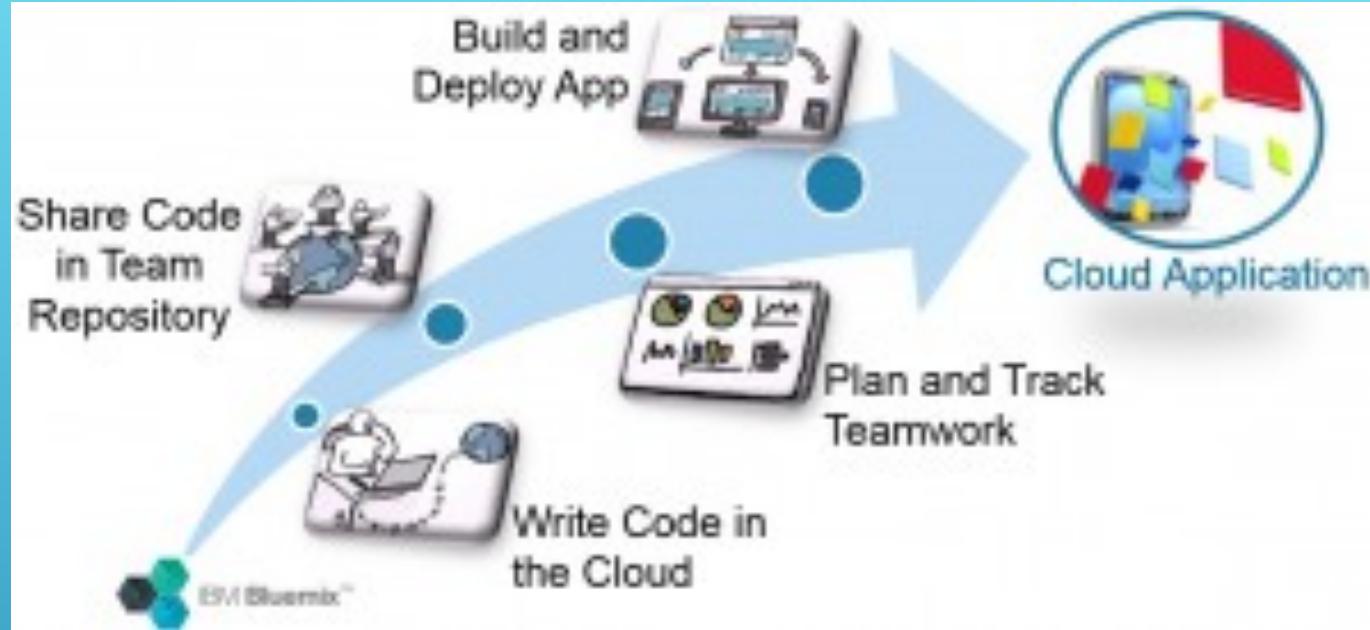
▼ Git

Git Url <https://hub.jazz.net/git/vlampkin/iotf-starter2/>

Git Repository Git Repository

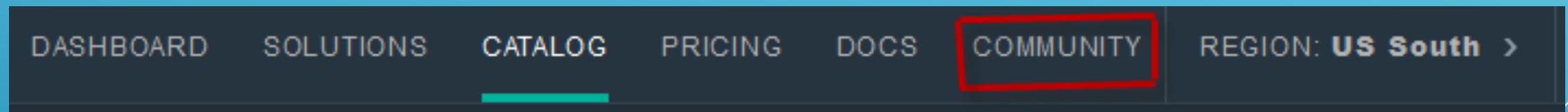
▼ vclampkin | iotf-starter2

📁 .git	3/10/2015, 3:02:03 PM
📁 defaults	3/10/2015, 3:02:03 PM
📁 launchConfigurations	3/10/2015, 3:02:05 PM
📁 nodes	3/10/2015, 3:02:03 PM
📁 public	3/10/2015, 3:02:03 PM
📁 .cignore	3/10/2015, 3:02:05 PM 1 KB
📁 .gitignore	3/10/2015, 3:02:04 PM 1 KB
📁 bluemix-settings.js	3/10/2015, 3:02:03 PM 3 KB



1. Create a Bluemix application
2. Write code in the cloud
3. Store code in Git repository
4. Plan and track teamwork
5. Build, deploy, and test your cloud app

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ValerieLampkin commented | yesterday

2
Answers Likes Views

Poseidon /sensors API issue

Davy4033 answered | 2 days ago

2
Answers Likes Views

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ValerieLampkin answered | 2 days ago

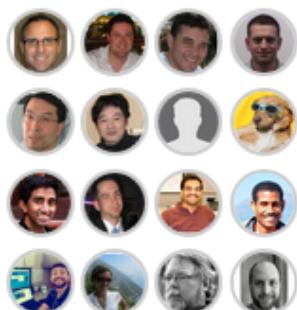
2
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Amit M Mangalvedkar commented | 6 days ago

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Node-Red - write to cloudant fails



Question by [jwende](#) | Jan 19 at 03:15 AM

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0



I have a simple node-red flow: - IoT Input Node - Cloudant Output Node My incoming Json object has elements with a starting underline character - it looks like that cloudant don't accept this format: Message (from debug output) (Object) { "cog": -1, "batt": "52", "lon": "13.9789", "acc": "65", "vel": -1, "vac": 13, "lat": "51.1307", "t": "u", "tst": "1421658556", "alt": 262, "_type": "location", "tid": "ON" } Error message from Cloudant node: "Error: Bad special document member: _type"

Any hints ? J.

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✓ Accepted answer

Answer by [knolleary](#) | Jan 19 at 04:51 AM

Hi,



0

You are right to say that Cloudant (Couchdb) does not allow fields to begin with an underscore - http://wiki.apache.org/couchdb/HTTP_Document_API#Special_Fields

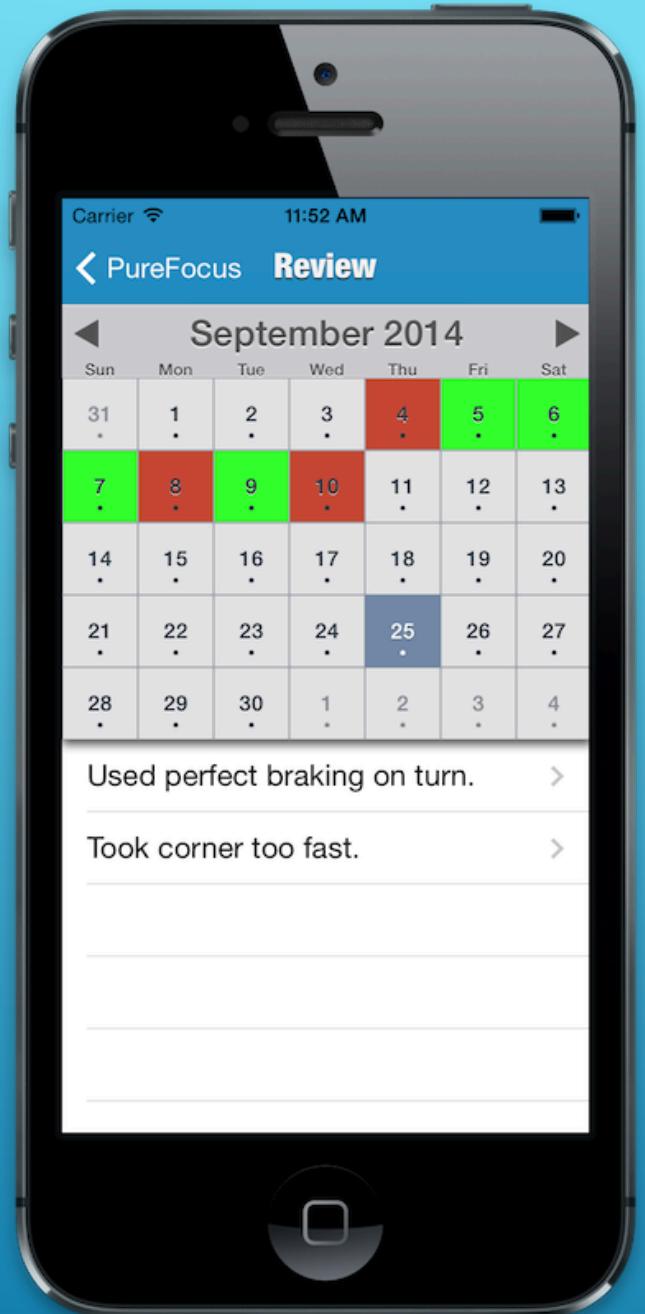


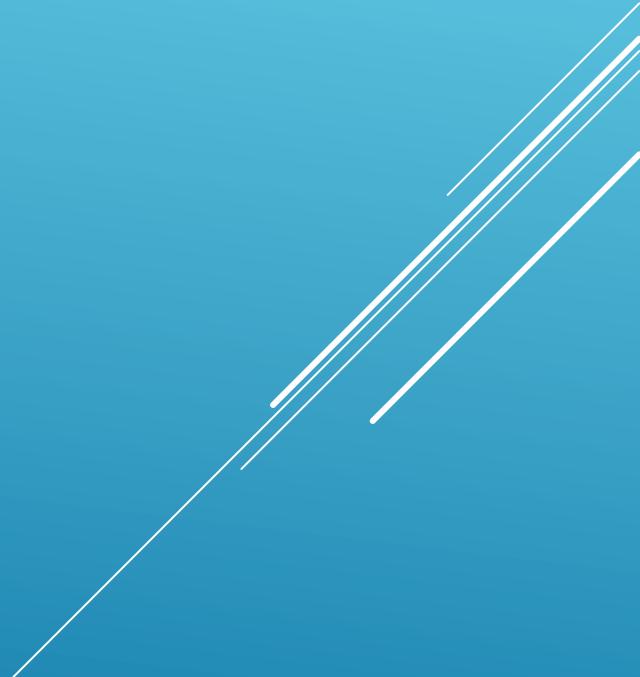
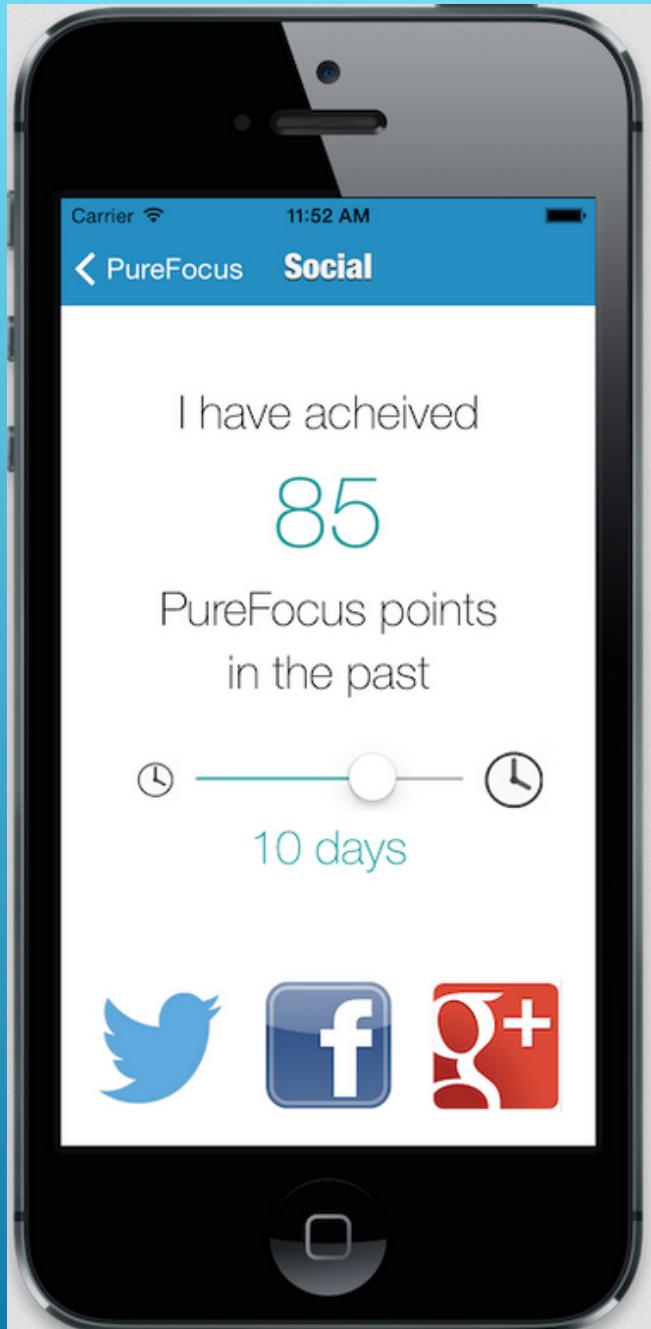
0

You will have to rename the `_type` field to something without the underscore before passing to the Cloudant node.

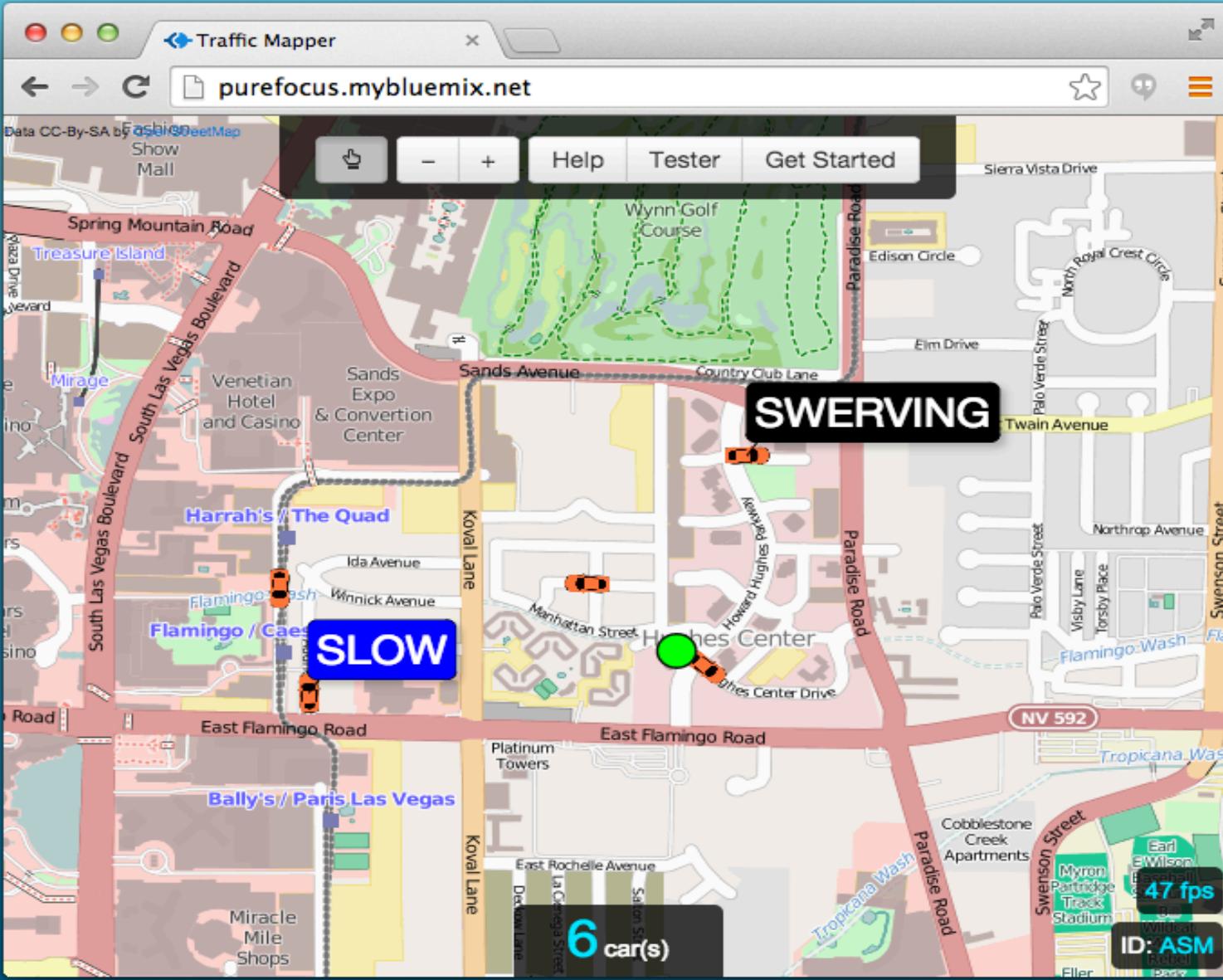
HACKATHON EXAMPLE

- ❖ Emerging use case-- natural language to trigger a query of IoT data





Connected Vehicle Hackathon Solution combines Bluemix, IoT Foundation and Watson analytics.



REAL WORLD EXAMPLES



Connected Car	\$600 billion
Clinical Remote Monitoring	\$350 billion
Assisted Living	\$270 billion
Home and Building Security	\$250 billion
Pay-As-You-Drive Car Insurance	\$245 billion
New Business Models for Car Usage	\$225 billion
Smart Meters	\$105 billion
Traffic Management	\$100 billion
Electric Vehicle Charging	\$75 billion
Building Automation	\$40 billion



CHALLENGES OF BOAT RACING



Fans



Commentators



Race Officials



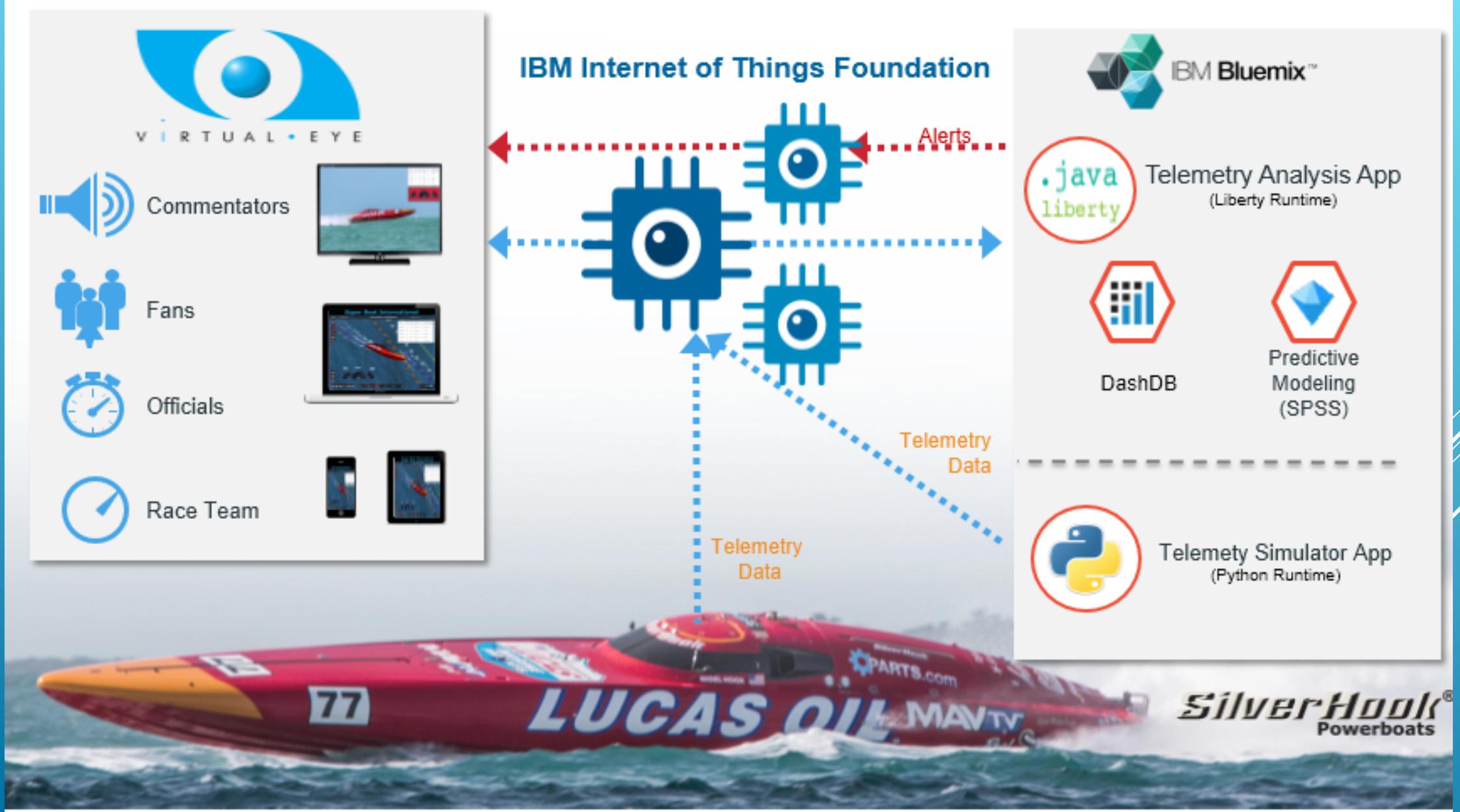
Race Teams

- Web Streaming, On Shore Viewing
- Limited Viewing & Vantage Point
- Multiple Classes (Who is Leading?)
- Validation of Race Winner

- Immediate Detection of Component Failures
- 80+ Telemetry Data being Captured 5/sec
- Need to Predict Component Failures

Solution: SilverHook, Virtual Eye and IBM

SilverHook®
Powerboats



Start your IoT project today!



Connect



Collect



Manage



Assemble



Get Started - Fast!



IBM Internet of Things Foundation

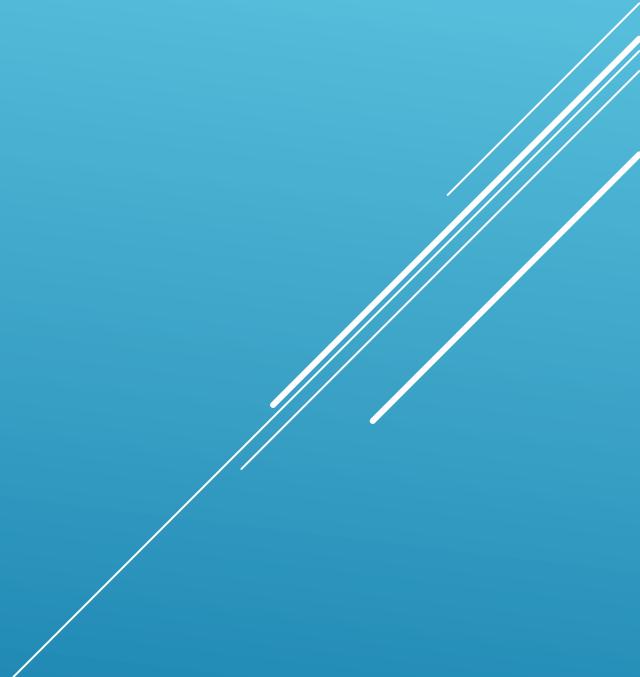
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Visit the main Landing page <https://internetofthings.ibmcloud.com>

Follow the community on Twitter @IBMIoT

Meetup Groups?



ADDITIONAL RESOURCES AND LINKS

Cloud Foundry: <http://www.cloudfoundry.org>

Get Started with Bluemix: <https://console.ng.bluemix.net/>

IoT Foundation: <https://internetofthings.ibmcloud.com/>

OASIS: [https://www.oasis-open.org/committees/tc_home.php?wg_abbrev= mqtt](https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=mqtt)

Bluemix Doc: <https://www.ng.bluemix.net/docs/#overview/overview.html#overview>

dwAnswers: <https://developer.ibm.com/answers/smart-spaces/12/bluemix.html>

Recipes for IoT: <https://developer.ibm.com/iot/>

Node-RED: <http://nodered.org/>

MQTT: <http://mqtt.org/>

DOCKER: <https://www.docker.com/>