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IBM Internet of Things Foundation - A peek into what's coming

Swati Sinha, IoT Foundation Development and MQ Support Manager



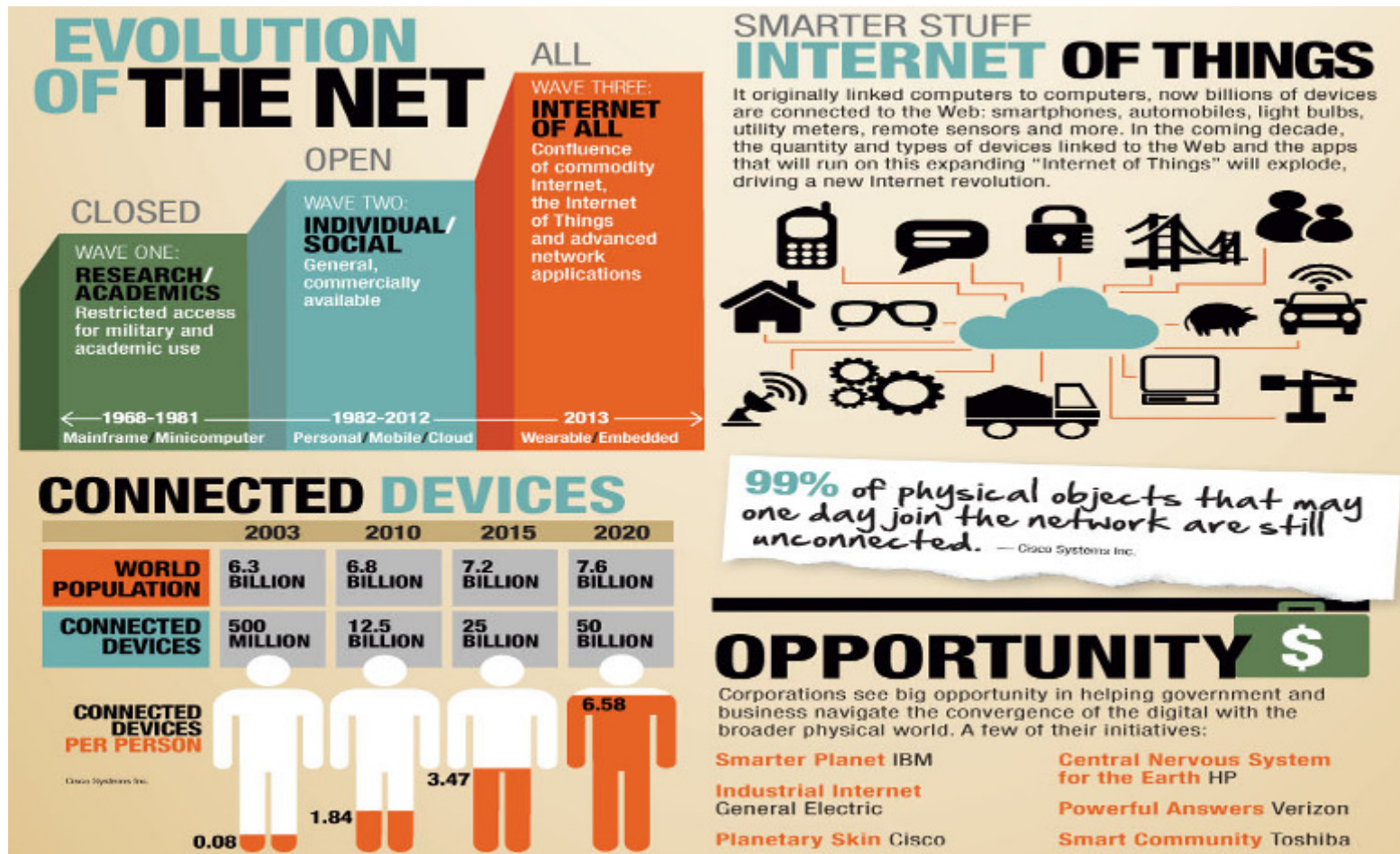
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Internet of Things is the next Internet Frontier



Source: <http://www.digitalcommunities.com/articles/FutureStructure-The-New-Framework-for-Communities.html>

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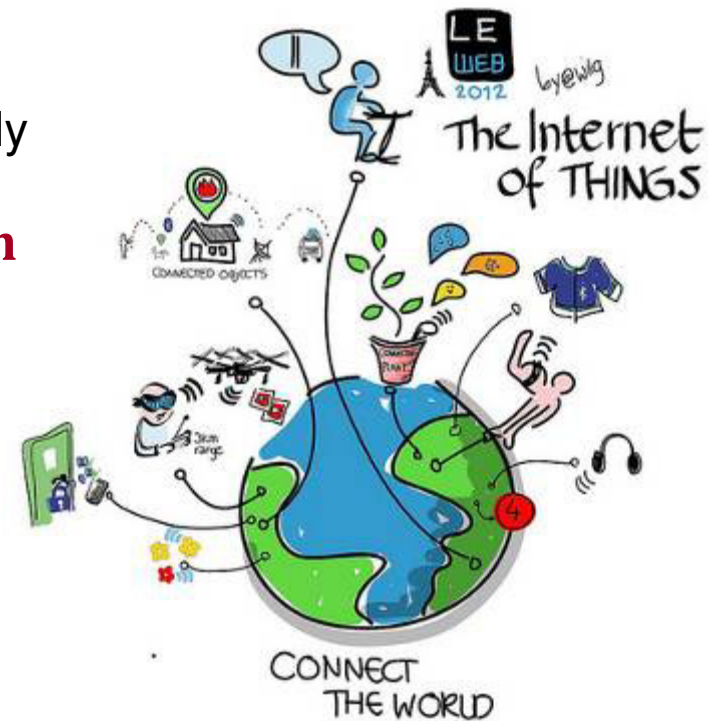
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The Internet of Things

- **9 billion** devices around the world are currently connected to the Internet, including computers and smartphones
- The number is expected to increase dramatically within the next decade, with estimates ranging from **50 Billion devices** to reaching **1 trillion**
- The Internet of Things has the potential to create *economic impact of \$2.7 trillion to \$6.2 trillion¹* annually by 2025



Source: Disruptive Technologies, McKinsey Global Institute, May 2013

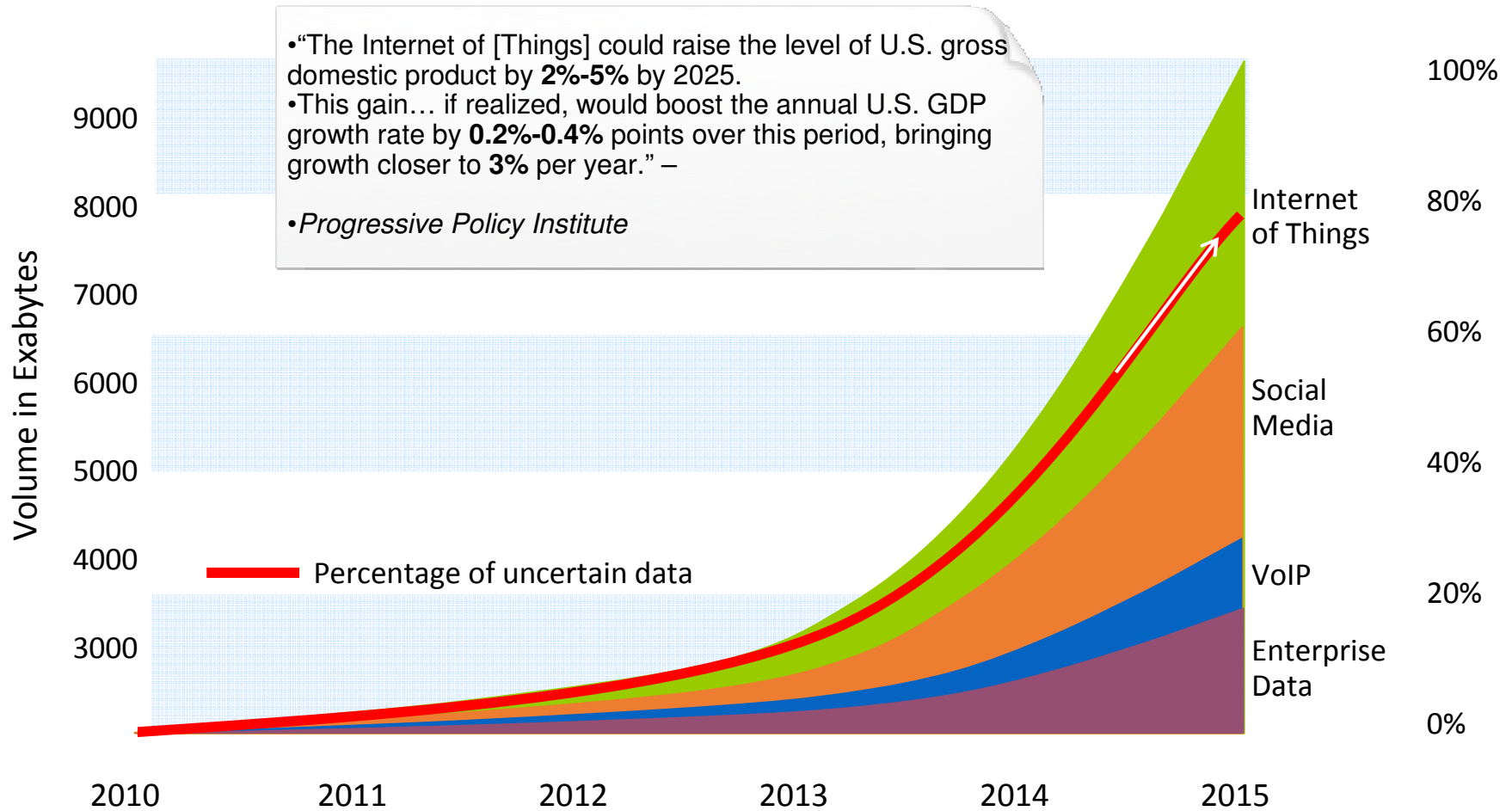
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This is driving Big data volumes



•“The Internet of [Things] could raise the level of U.S. gross domestic product by **2%-5%** by 2025.
•This gain... if realized, would boost the annual U.S. GDP growth rate by **0.2%-0.4%** points over this period, bringing growth closer to **3%** per year.” –
•*Progressive Policy Institute*

Sources: IBM Global Technology Outlook – 2012

http://www.progressivepolicy.org/wp-content/uploads/2013/09/09.2013-Mandel_Can-the-Internet-of-Everything-Bring-Back-the-High-Growth-Economy-1.pdf



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GSMA “Connected Life” forecast **\$4.5T in 2020**

▪ **Connected Life** is everything that is connected and how they interact:
cars, mobile devices, buildings, sensors and people

▪ Top Ten in 2020

1. Connected Car	\$600 billion
2. Clinical Remote Monitoring	\$350 billion
3. Assisted Living	\$270 billion
4. Home and Building Security	\$250 billion
5. Pay-As-You-Drive Car Insurance	\$245 billion
6. New Business Models for Car Usage	\$225 billion
7. Smart Meters	\$105 billion
8. Traffic Management	\$100 billion
9. Electric Vehicle Charging	\$75 billion
10. Building Automation	\$40 billion

Source: <http://www.globaltelecomsbusiness.com/article/2985699/Connected-devices-will-be-worth-45t.html>



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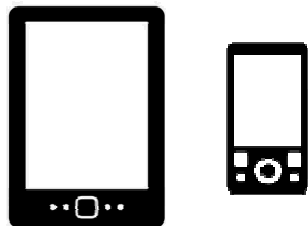
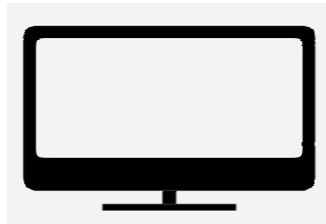
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Technology shift: Consumers lead the Internet of things

Today

A few connected devices per person...



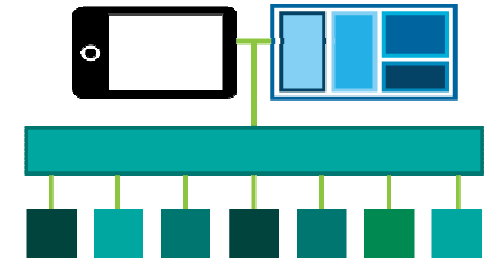
Tomorrow

Almost every device that consumers own will be connected, and many new ones will be created to leverage the value created by consumer connections.

Window Lock Toothbrush
Door Lock Garage Door
Dishwasher Garden Moisture
Home Lights
Washing Machine Coffee Maker

Integration

Cross-platform integrators will connect devices and automate personal activity:



Just as consumers have led enterprises in embracing new mobile services, we believe they will lead the adoption of connected devices & integrated services

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All Internet of Things Use Cases have a **Common Set of Fundamental Requirements**

- Easily on-board any connected “thing”
- Create a real-time communication channel with the “thing”
- Secure, scalable gateway to consume large volumes of incoming data from the “things”
- Storing the data captured in a historian DB
- Provide access to the collected data
- Pay for the service based on usage

Extended Requirements:

- Provide a layer of analytics on the data in both real-time and on historical trend data
- Trigger events based on specific data conditions
- Interact with the “thing” from business apps and/or from mobile devices

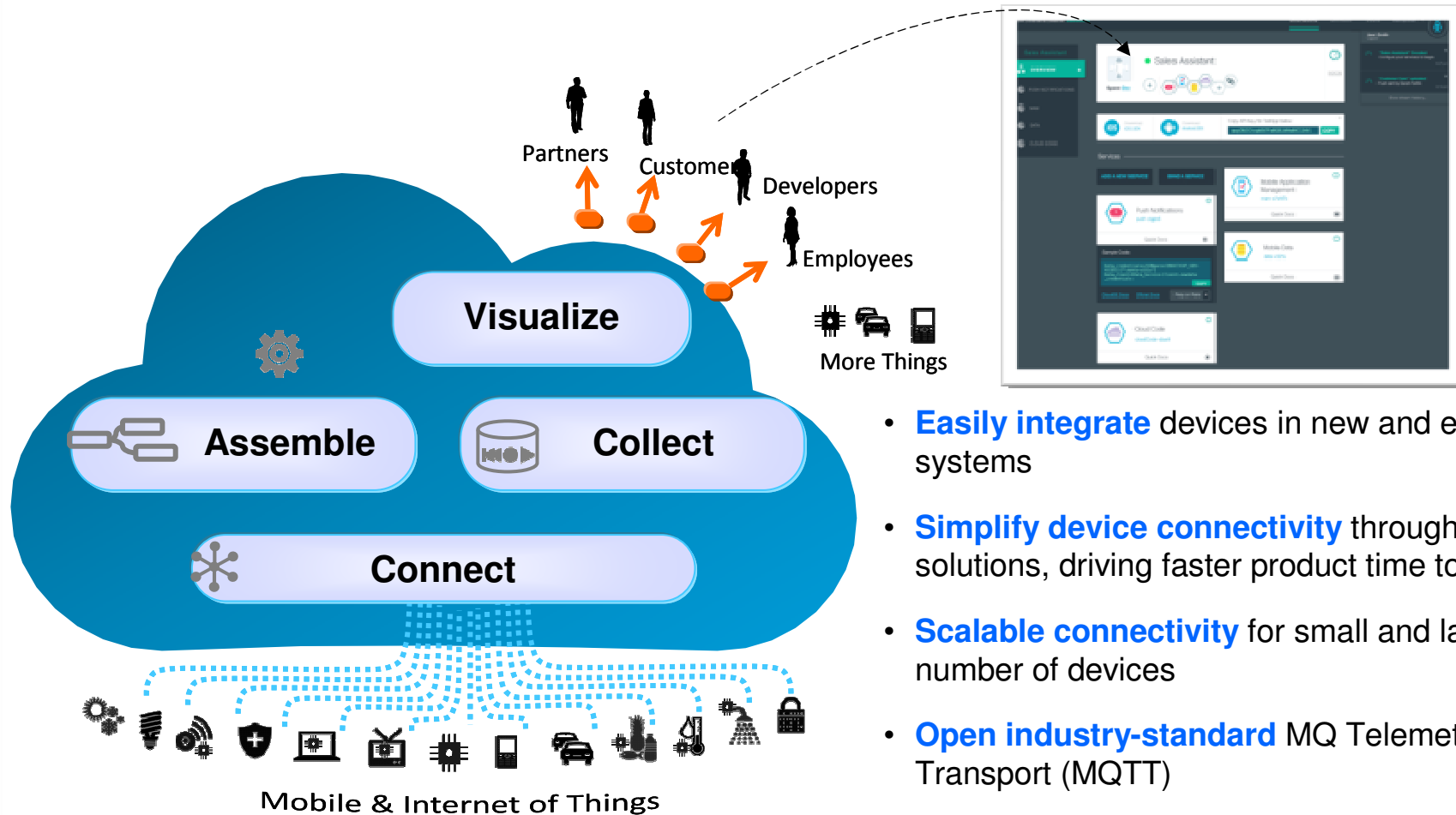


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IBM Internet of Things Foundation



- **Easily integrate** devices in new and existing systems
- **Simplify device connectivity** through cloud solutions, driving faster product time to market
- **Scalable connectivity** for small and large number of devices
- **Open industry-standard** MQ Telemetry Transport (MQTT)
- **Enable better business outcomes** through real-time analytics



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Try our Internet of Things Foundation QuickStart ...

The screenshot shows a web browser window with the URL `quickstart.internetofthings.ibmcloud.com/#/`. The page header includes the IBM logo and navigation links for `IoT Foundation`, `Recipes`, and `Quickstart`. The main content area is divided into three sections:

- Left Panel:** A box titled "Ready to view data?" with a text input field labeled "MWC Address" and a "Go" button.
- Center Panel:** A large orange box with the heading "Cloud-connect your Things in minutes" and the sub-heading "Write apps that use the data from real physical devices". It features icons of a microchip, a robot, a cloud containing binary code, and a smartphone displaying a bar chart.
- Right Panel:** A box titled "Sign up to the Beta and you can..." with the text: "Store device configuration for up to 10 devices and publish and subscribe to and from those devices. Store your device data for up to 7 days and access it securely using API keys." and a "Sign up now for our Beta" button.

Below the center panel, there are three sections of text:

- Are you ready to connect your device to our Internet of Things Foundation QuickStart?**
Just enter your device ID and click Go.
- Do you need to set up your device?**
Follow our simple recipes to configure, connect and visualize.
- Take the next step**
Build an app using Internet of Things data with our Bluemix application development platform.



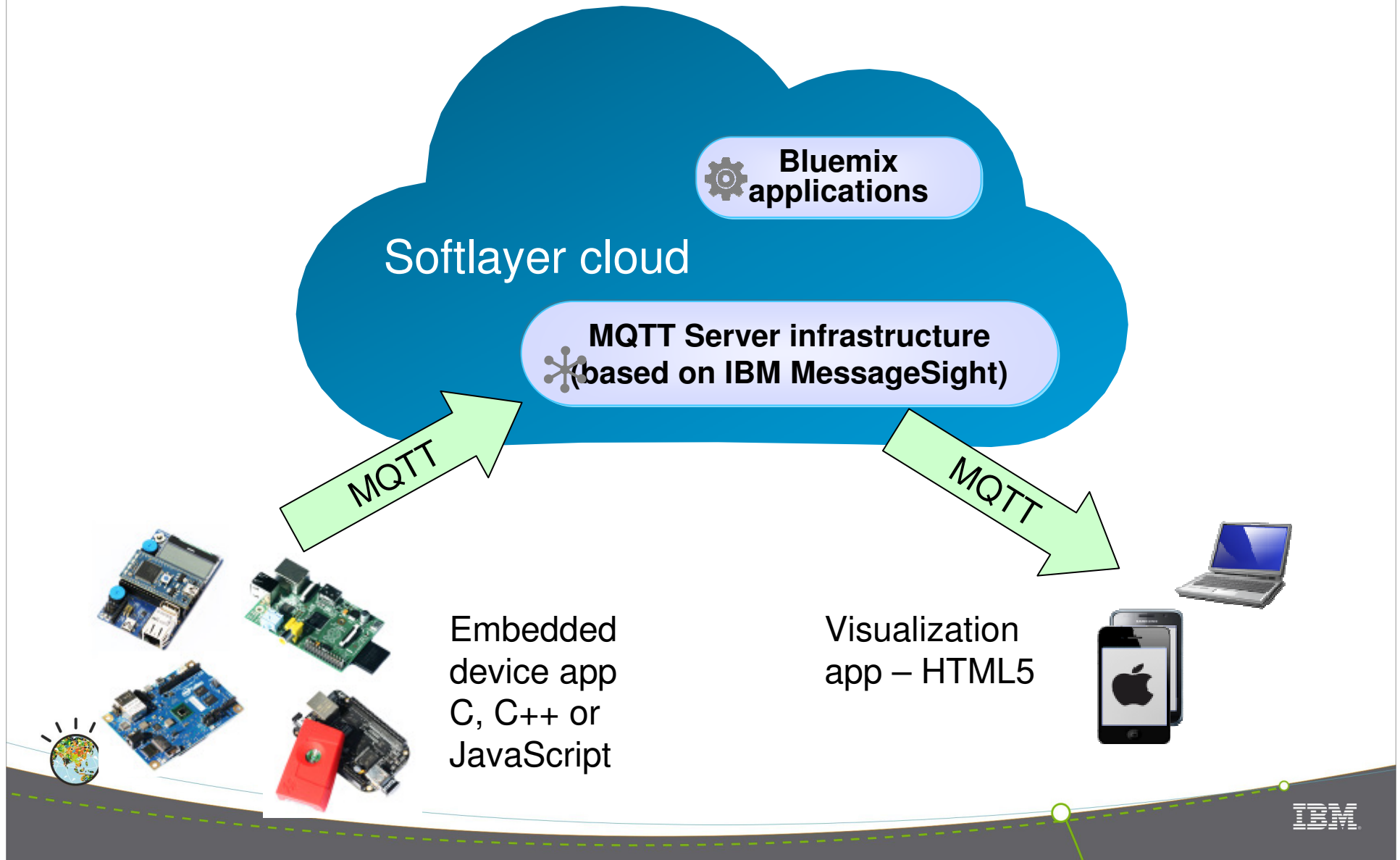
www.internetofthings.ibmcloud.com

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Quickstart - how is it implemented?

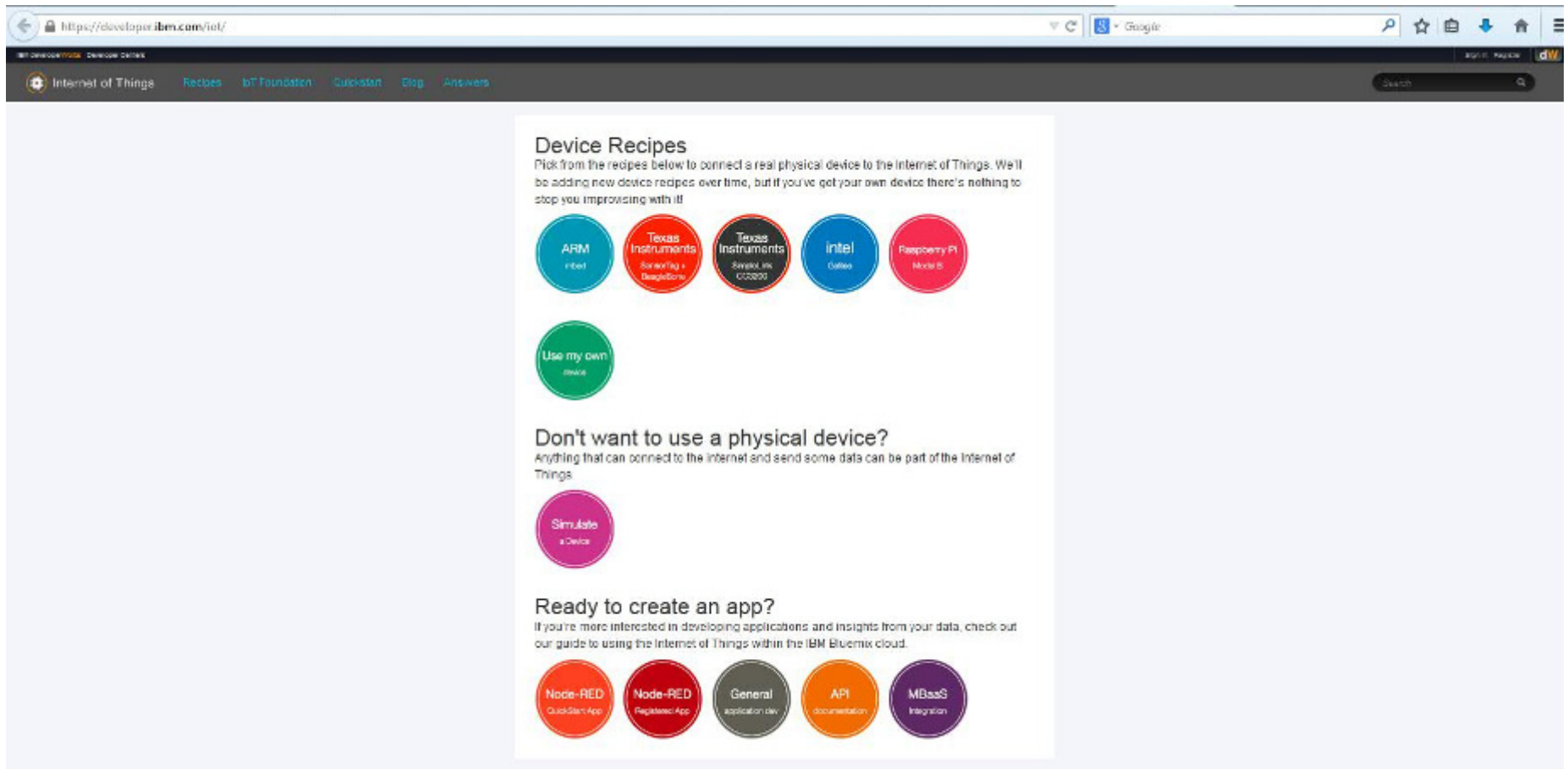


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The First Recipes



The screenshot shows a web browser at the URL <https://developer.ibm.com/iot/>. The page features a navigation bar with links for 'Internet of Things', 'Recipes', 'IoT Foundation', 'Quickstart', 'Blog', and 'Answers'. The main content area is titled 'Device Recipes' and includes the following sections:

- Device Recipes**: A heading followed by the text: 'Pick from the recipes below to connect a real physical device to the Internet of Things. We'll be adding new device recipes over time, but if you've got your own device there's nothing to stop you improving with it!'
- Device Selection Grid**: A row of five circular buttons: 'ARM' (blue), 'Texas Instruments' (red), 'Texas Instruments' (red), 'intel' (blue), and 'Raspberry Pi' (pink).
- Use my own device**: A green circular button.
- Don't want to use a physical device?**: A heading followed by the text: 'Anything that can connect to the Internet and send some data can be part of the Internet of Things.'
- Simulate a Device**: A purple circular button.
- Ready to create an app?**: A heading followed by the text: 'If you're more interested in developing applications and insights from your data, check out our guide to using the Internet of Things within the IBM Bluemix cloud.'
- App Creation Grid**: A row of five circular buttons: 'Node-RED' (red), 'Node-RED' (red), 'General' (grey), 'API' (orange), and 'MBaaS' (purple).



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

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Internet of Things is part of our Bluemix Platform

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

Boilerplates



Get started with a new app, now

-  **WEB APP STARTER**
Java Cloudant Web St...
IBM
-  **JAVA DB WEB STARTER**
Java DB Web Starter
IBM
-  **JAVA**
Java Web Starter
IBM
-  **MOBILE CLOUD**
Mobile Cloud
IBM
-  **NODE.JS**
Node JS Web Starter
IBM
-  **Internet of Things**
Internet of Things Starter
Community
-  **NODE-RED STARTER**
Node-RED Starter
Community

Services // The building blocks of any great app

Internet of Things

A new generation of applications

-  **Internet Of Things**
IBM BETA
-  **Wearable Fitness**
Wearable Fitness
Community



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IoT Foundation offering in Bluemix

IoT Starter Boilerplate

- Node-RED + IoT Foundation nodes
- Cloudbant DBaaS

New IoT Foundation Service

- Connect devices
- Create full-duplex real-time connections

The screenshot shows the Bluemix IoT Starter boilerplate page. On the left, there is a card for 'Internet of Things Starter' with a version of 0.4.7. The main content area features a dark header with icons for 'SDK for Node.js' and 'Cloudbant NoSQLDB'. Below the header, a text box says 'Quickly get started with Internet of Things using Node-RED in Bluemix. Powered by SDK for Node.js™' and includes a 'VIEW DOCS' button. On the right, a 'Create an app' form is visible, with fields for 'Name' (containing 'Enter new app name'), 'Host' (containing 'mybluemix.net'), and 'Selected Plans' (showing 'Default' for SDK for Node.js and 'Shared' for cloudbantNoSQLDB).



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Node-RED in Bluemix

Node-RED in Bluemix

Node-RED

A visual tool for wiring the Internet of Things
BlueMix Edition



Node-RED

inputs

- inject
- mqtt
- http
- udp
- websocket
- iot-app
- tcp

outputs

- debug
- mqtt
- http response
- udp
- websocket
- iot-app
- tcp
- twilio

Quickstart

device data

IoT App In

temp

temp thresh

safe

danger

cpu status

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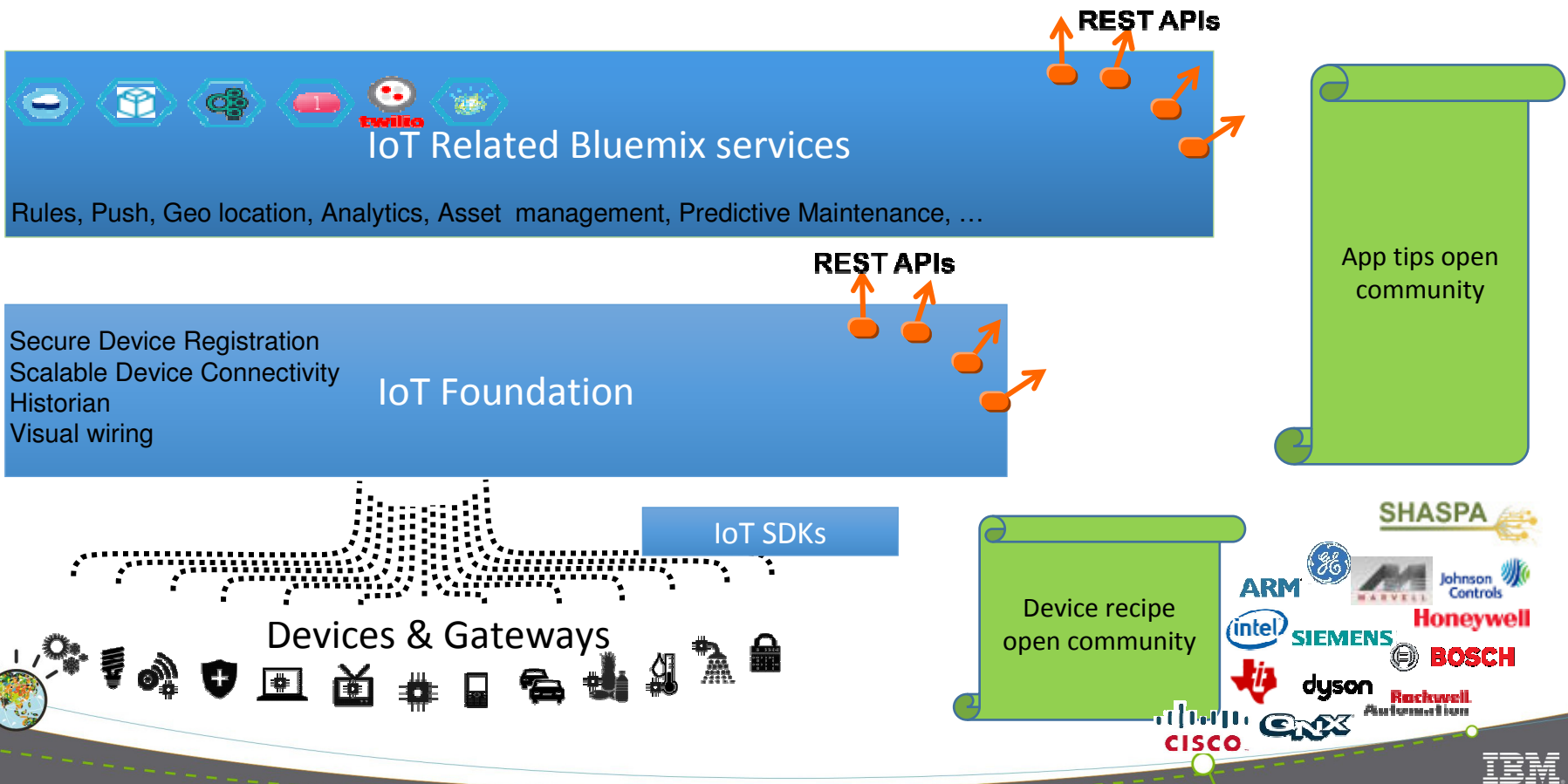
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IoT as a Composable Business

IoT end-end solutions

Connected appliance solutions, Smarter home solutions, ...

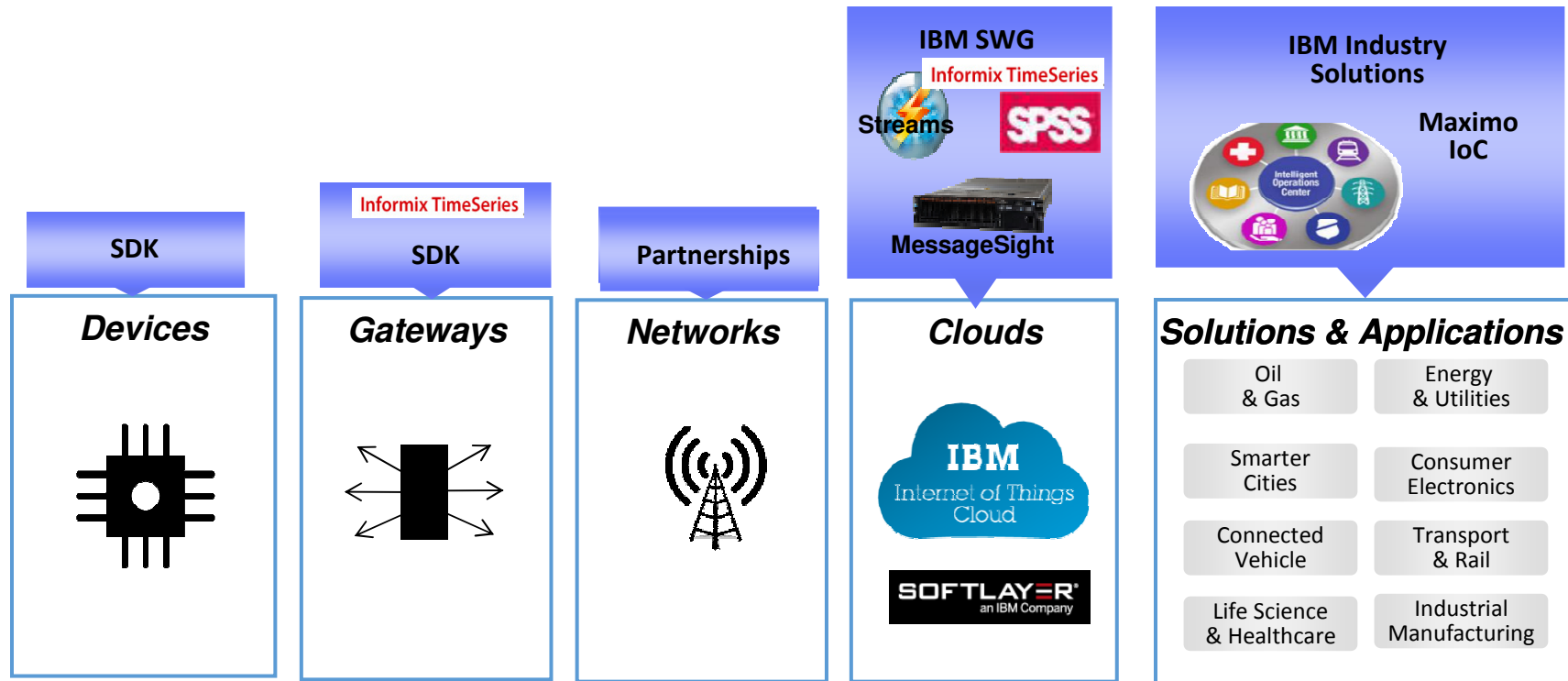


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Internet of Things Ecosystem and Partners are crucial

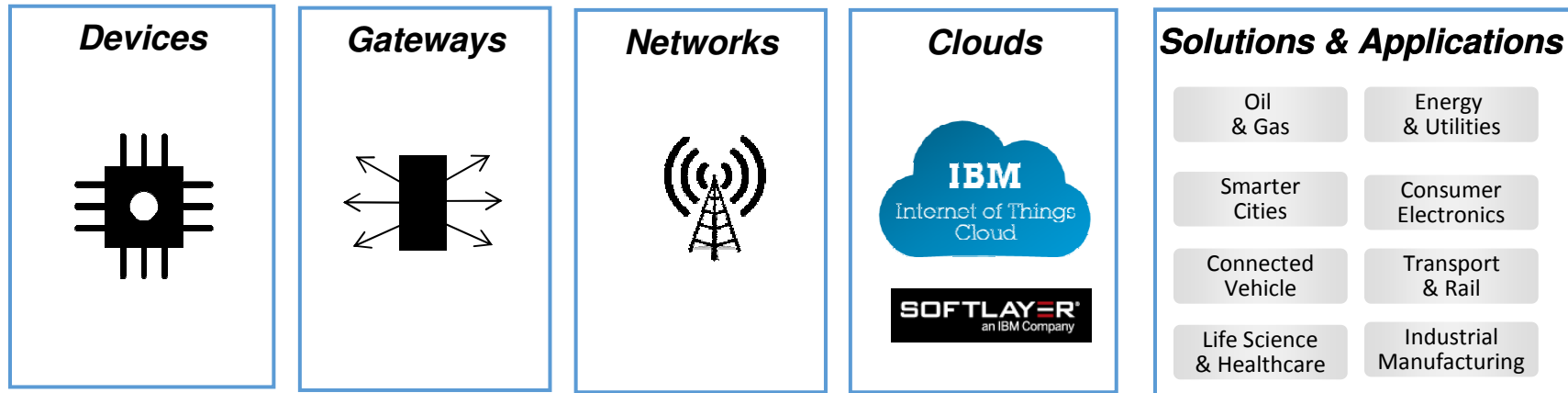


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Internet of Things Ecosystem and Partners



Other Ecosystem

Industrial Internet Consortium



Internet of Things Foundation Quickstart and Bluemix



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What You Can Do with It?

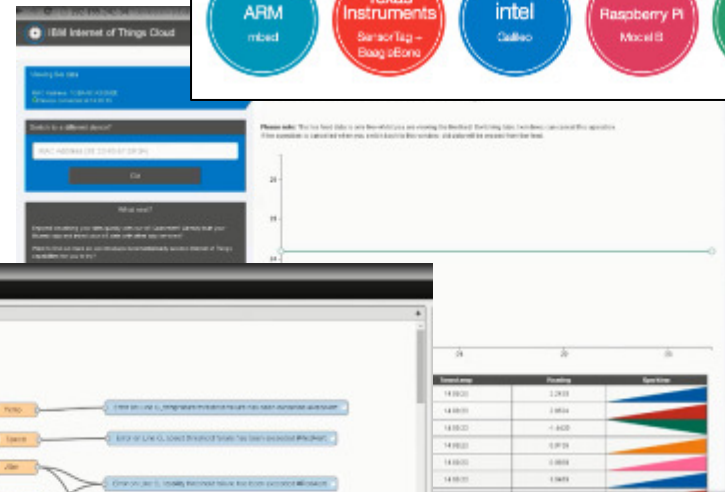
Select from a growing list of device recipes

Device Recipes

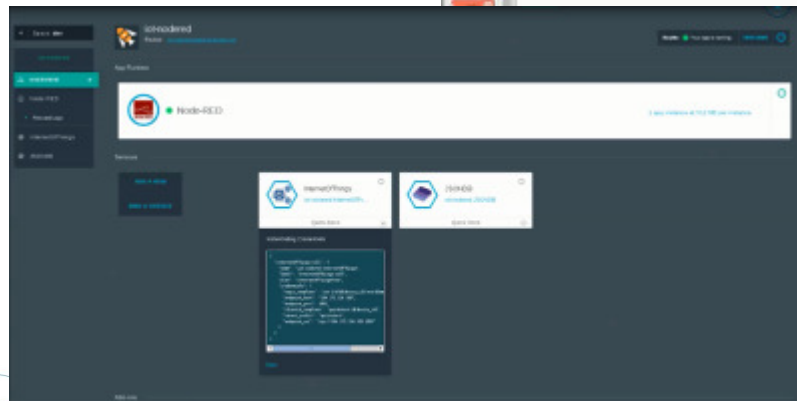
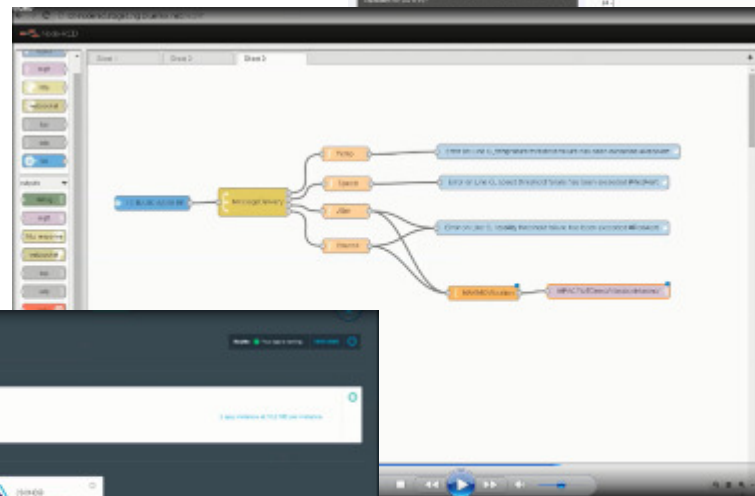
Pick from the recipes below to connect a real physical device to the Internet of Things. We'll be adding new device recipes over time, but if you've got your own device there's nothing to stop you improvising with it!



Simply connect & “recognize” device types
Visualize real-time data stream



Visually define logic flows
using Node-RED



Mix with other services in Bluemix
Build applications that incorporate IoT



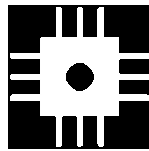
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Summary

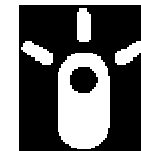
- Mobile devices now outnumber the human population
- New silicon connectivity opens up a massive Internet of Things marketplace
- 82% of IT decision makers think Machine-to-Machine interaction enables businesses to respond to real world events
- Successful companies will be those creating an Internet of Things strategy that embraces instrumented, interconnected and intelligent



instrumented



interconnected



intelligent



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Next Steps

1. Think about how Internet of Things will change *your* business

- Learn from those already on their journey
- Focus on monetizing, optimizing, extending or controlling your world

2. Learn more

- Try [IBM Internet of Things Cloud Quickstart!](#)
- Play with [Node-Red](#)
- Signup for the [Bluemix beta](#)

3. Get Involved

- Register interest in our Early Access Program for new Internet of Things Foundation function

4. Schedule Internet of Things Workshop

- Speak to your IBM representative about a best practices workshop including exploration of use case & value assessment



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Resources

- Try our Internet of Things Cloud Quickstart at internetofthings.ibmcloud.com
- Check out recipes to connect your devices and learn how to build a Bluemix IoT app ibmdw.net/iot
- Stay social ... follow & interact [@IBMIoT](https://twitter.com/IBMIoT) twitter.com/IBMIoT
- Check out articles on our blog ibminternetofthings.tumblr.com
- Check out a range of Online IoT demos <http://m2m.demos.ibm.com>



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