



The IoT and ZNE – Friends or Foes?

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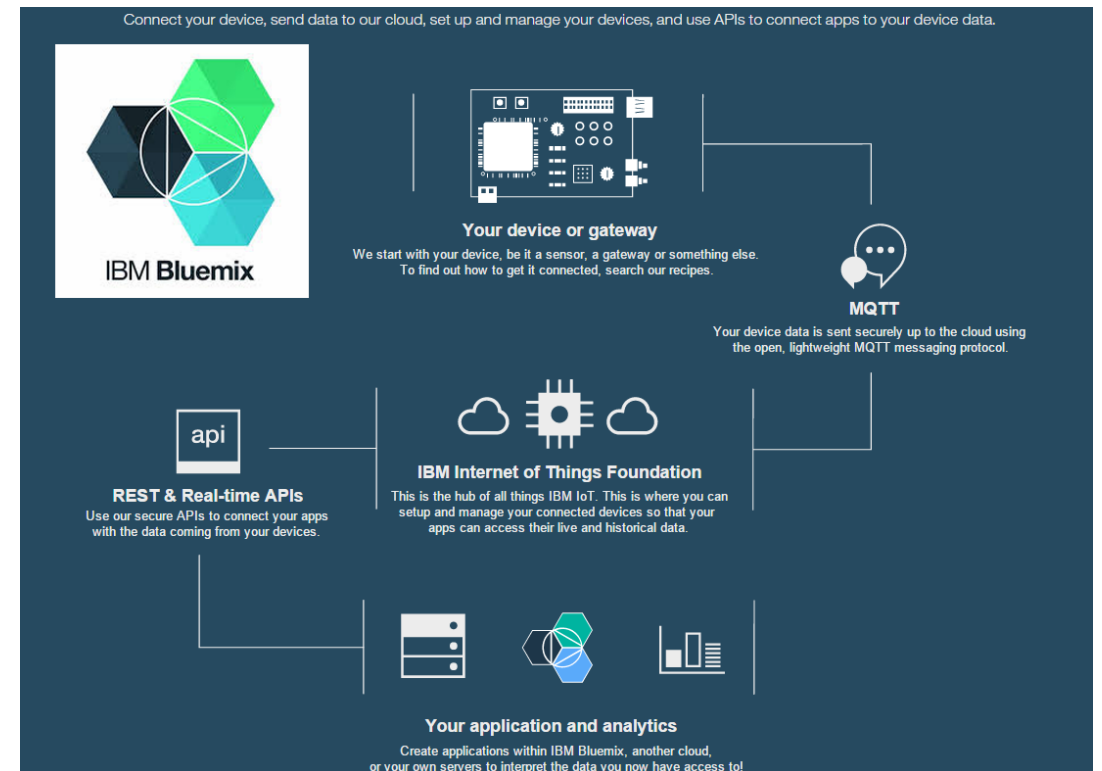
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A Very Crowded Landscape (We've only just begun..)



“IoT’ing”: Getting Easier by the Day..

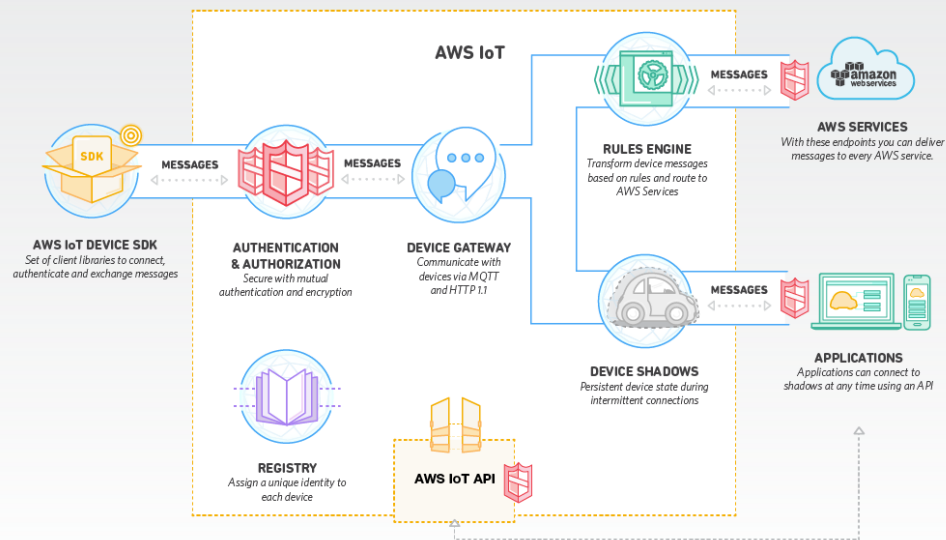
The screenshot shows the Microsoft Azure IoT Suite website. At the top, there is a navigation bar with links for Microsoft, Cloud Platform, Solutions, Products, Support, Partner, and About. Below this is a search bar. The main heading is "Internet of Things" with a "Get started" button. A secondary navigation bar includes "Overview", "Why Microsoft", "Azure IoT Suite", "Industry solutions", and "Partners". The main content area features a large image of a robotic arm and the text "Create the Internet of Your Things". Below this, it says "The Internet of Things (IoT) starts with your things—the things that matter most to your business. Welcome to the Internet of Your Things." and includes a link to "Watch Microsoft's vision for IoT". At the bottom, there is a blue bar with a "Learn more about Azure IoT Suite" link.



“IoT’ing”: Getting Easier by the Day..

AWS IoT Features

AWS IoT is a platform that enables you to connect devices to AWS Services and other devices, secure data and interactions, process and act upon device data, and enable applications to interact with devices even when they are offline.



Solutions

- Learn
- Why Google
- Customer successes
- Partners
- Products
- Resources

Internet of Things

There is the potential for 50 billion connected devices by 2020. Google Cloud Platform gives you the tools to scale connections, gather and make sense of data, and provide the reliable customer experiences that hardware devices require.

[Go to Console](#)



Learn

Getting started

[Learn how to setup BigQuery Streaming](#)
Learn how to use the BigQuery streaming API to insert device metrics into append only BigQuery tables.

Taking it to the next level

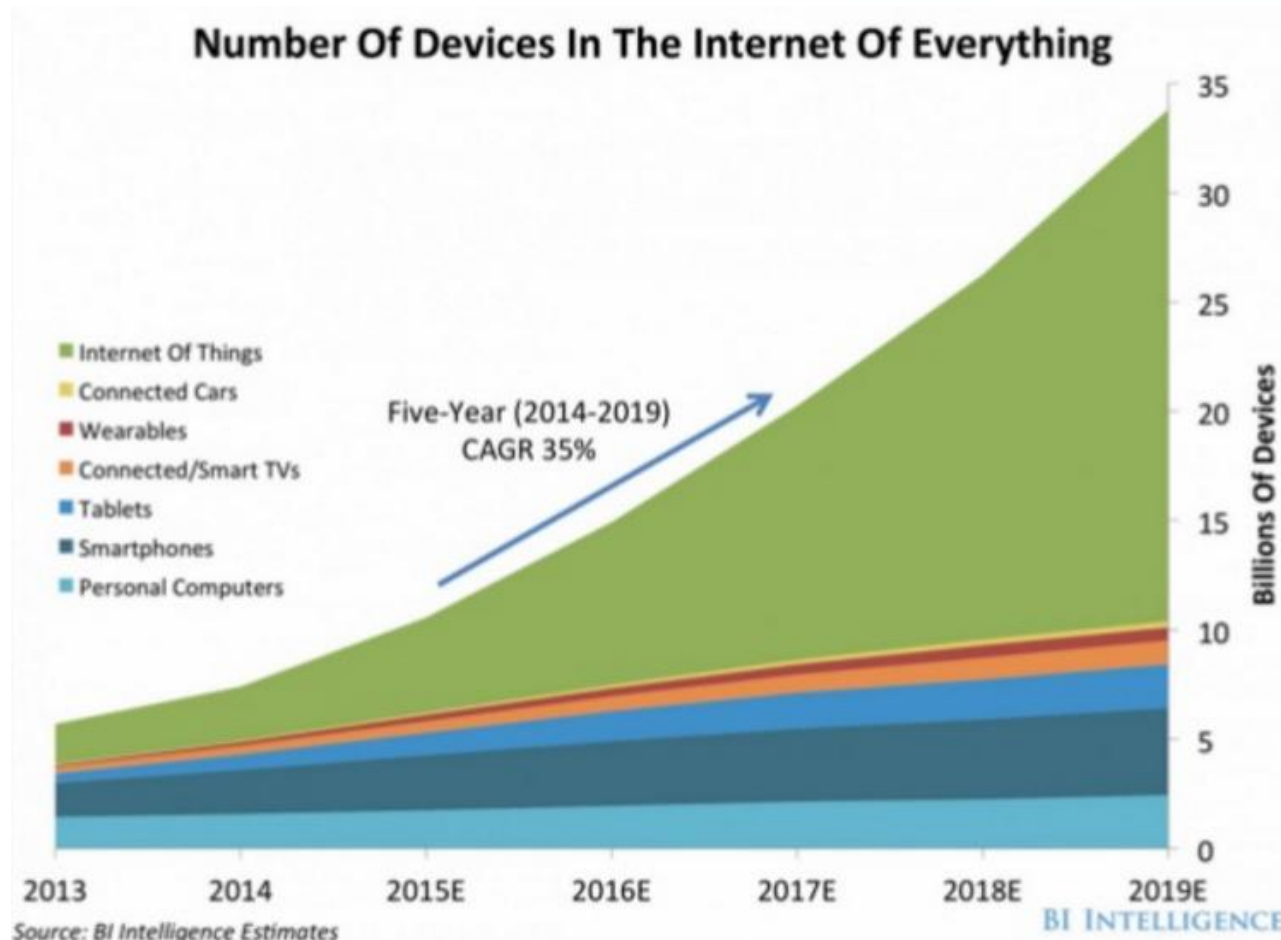
[Pub/Sub Documentation](#)
The Pub/Sub documentation will walk you through the steps of setting up topics and subscriptions to allow routing of device data to multiple backend systems that can perform different processing and archiving tasks.

Solutions

[Device Streaming](#)
See one possible architecture that leverages global load balancing on the edge, and App Engine for scalable message processing from many connected devices.

[Learn more about How to Build Solutions](#)

IoT Explosion



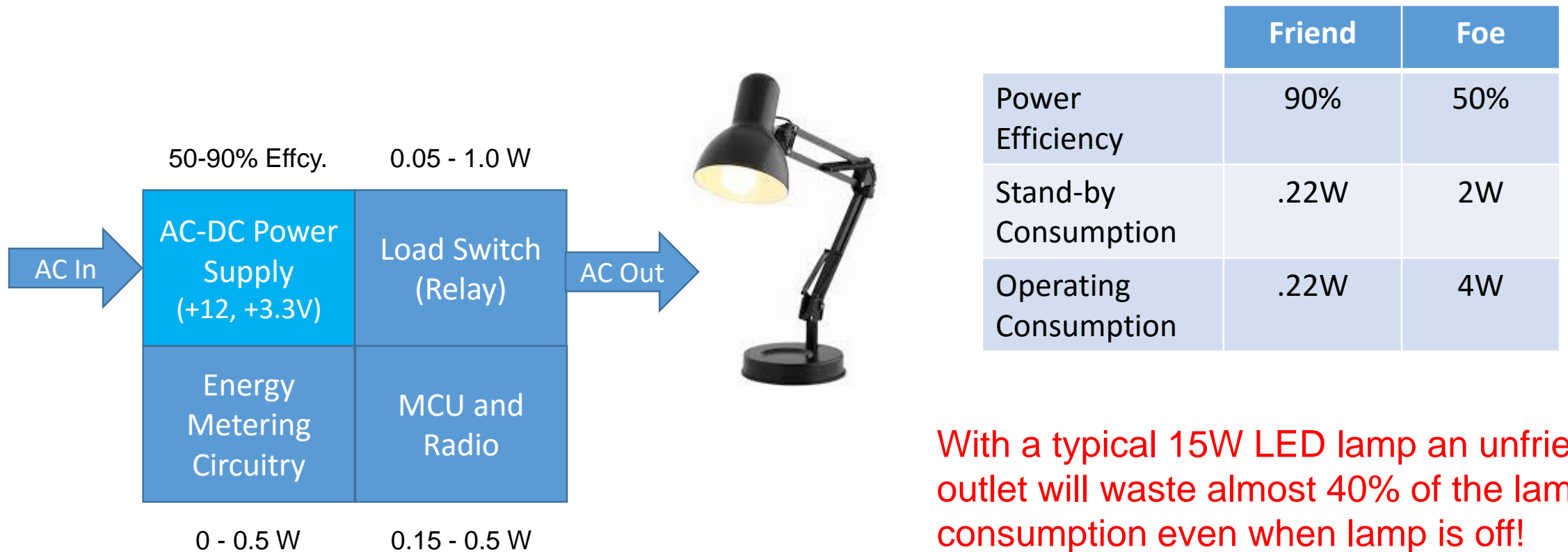
So many connected devices! Will their stand-by and operating power be aligned with ZNE goals?

A Smart Outlet: Friend or Foe?

- A typical metering smart socket is intended to save energy
 - Provides ability to measure relevant energy parameters
 - Can be scheduled to turn off appliance during high energy costs periods
 - Can provide periodic energy consumption snapshots to enable proactive use
- Considered for wide (and mandated) deployment in many smart city projects



Dissecting the Typical Smart Load Controller



	Friend	Foe
Power Efficiency	90%	50%
Stand-by Consumption	.22W	2W
Operating Consumption	.22W	4W

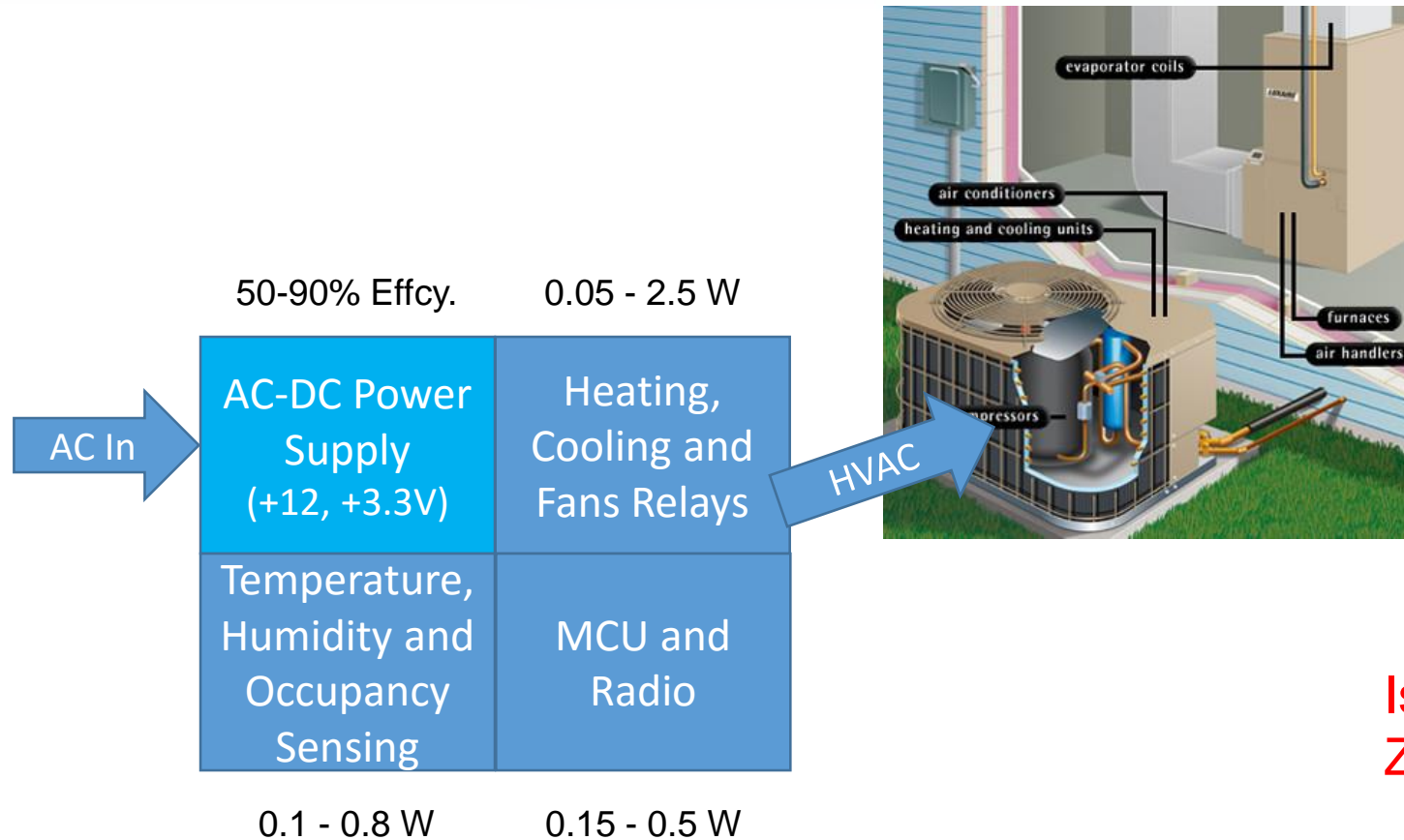
With a typical 15W LED lamp an unfriendly outlet will waste almost 40% of the lamp consumption even when lamp is off!

A Smart Thermostat – Friend or Foe?

- A connected thermostat aims to save us energy and provide convenience
 - Can learn our habits and adjust itself accordingly
 - Can be in tune with utility and get economic benefits from conservation
 - Can be remotely accessed for monitoring and adjustment
- Considered for wide (and mandated) deployment in many smart city projects



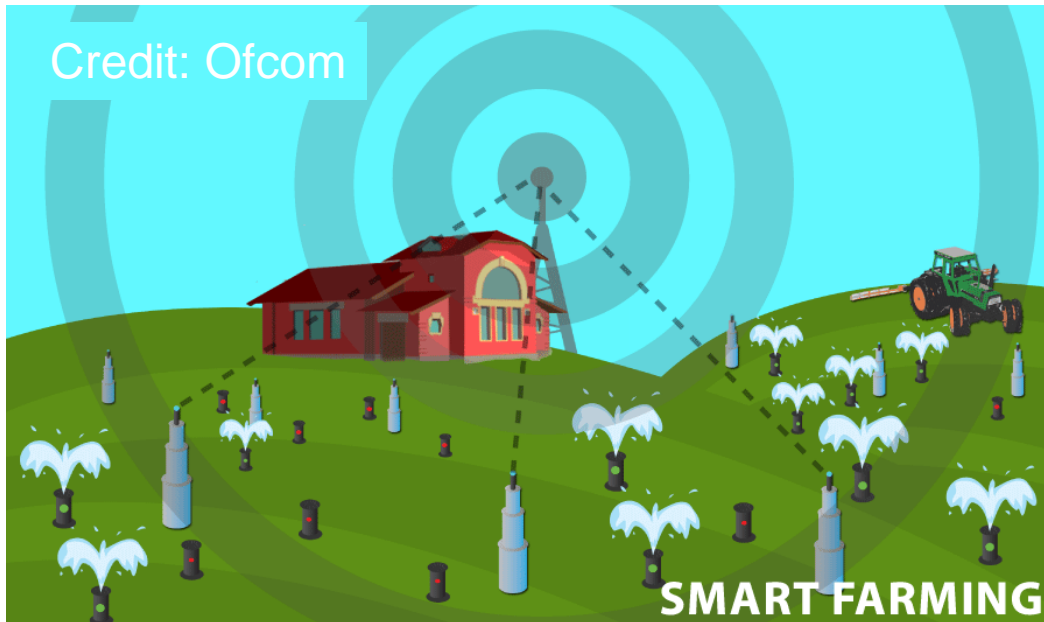
Dissecting the Typical Smart Thermostat



	Friend	Foe
Power Efficiency	90%	50%
Stand-by Consumption	.33W	5W
Operating Consumption	1W	7.6W

Is there reason to be concerned about ZNE friendliness of smart thermostats?

Large Sensor Networks



50-90% Effcy.

Battery or AC Mains Supply (+3.3V)	
Sensor Circuitry	MCU and Radio
0.1 - 0.8 W	0.15 - 0.5 W

Are we considering ZNE friendliness of sensors as deployment grows exponentially?

Considerations for ZNE/IoT Friendliness

- High efficiency actuators
 - Latching relays
 - Limit switches
- Passive, close-to-lossless sensors (e.g. CTs vs shunts)
- Sleep/Awake algorithms
- Energy harvesting technologies
- Choice of wireless connectivity technology (e.g. WiFi, ZigBee, Cellular) and topology (direct-to-cloud or gateway) based on application
- Manufacturers proactivity before imposed regulations



Smartenit: An IoT Company

- Broad provider of everything IoT: gateways, actuators, sensors and cloud services based on ZigBee, WiFi, cellular and INSTEON
- First EVSE controller certified by ZigBee Alliance
- First to implement ZigBee-based, commercial nation-wide EVSE network deployed by large provider
- Member of CalPlug, ZigBee Alliance, and Open Charge Point Alliance
- Newly formed Smartenit.io focuses on IoT solutions