Why Lighting Systems will become more connected?

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November 16, 2015

Agenda

1 | What is the Internet of Things?

2 | Why would I want to do that?

3 | How would I do that?

4 | Challenges?

IoT Is Accelerating

Hundreds of Real Deployments Mapped Out

95%

Planning to Deploy IoT Within 3 Years

Source: www.iotwf.com/iotwf2014/deployment_map

What is the Internet of Things?

"sensors and actuators connected by networks to computing systems."

----- McKinsey & Company

What is the Internet of Things?

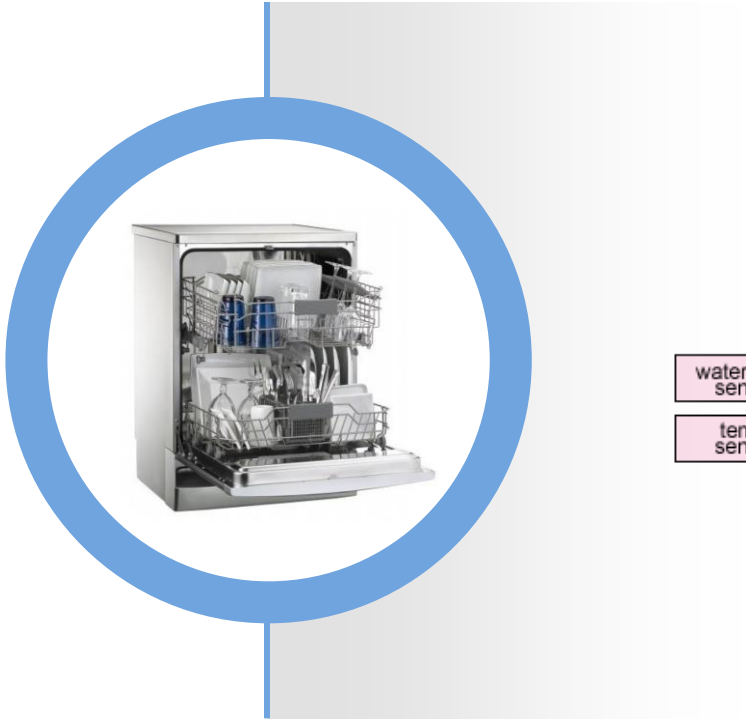
Alternate Definition

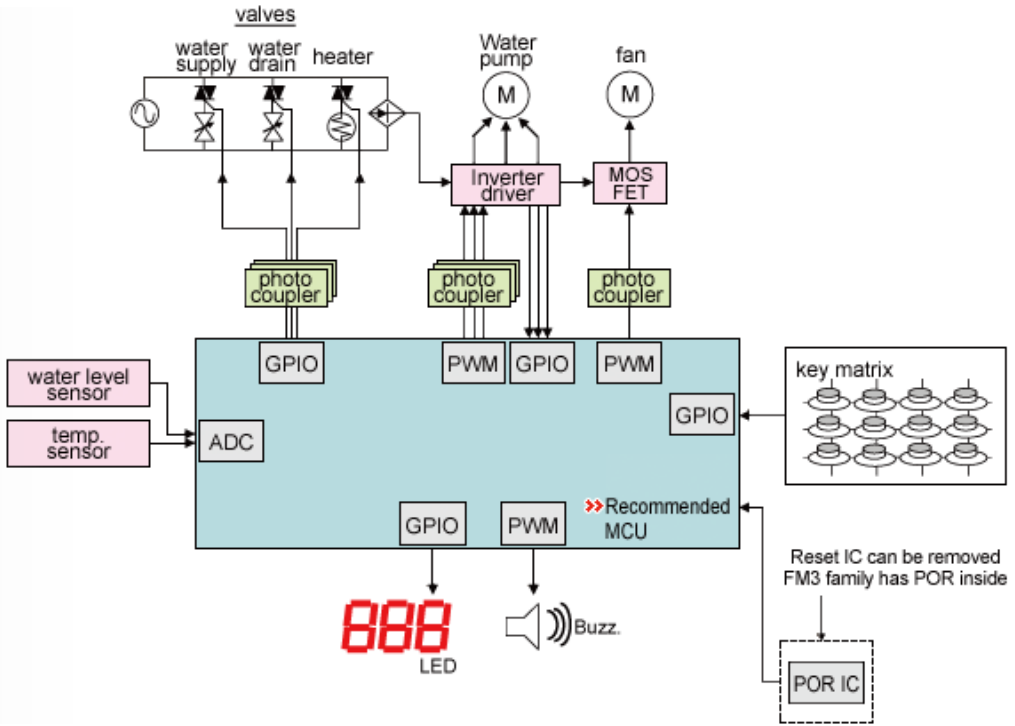
"Devices connected to networks that you are not yet accustomed to being connected to networks."

The Things

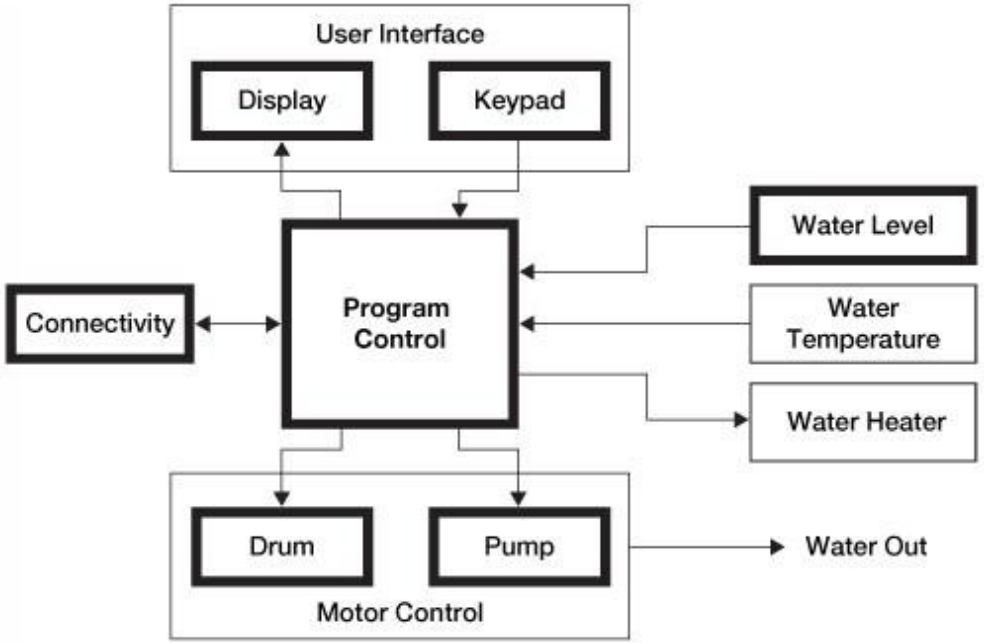
- More and more Electric Devices have Processors
  - Cheaper than electro mechanical
  - Provide a different experience
- IoT – networking the devices already processor enabled

Dishwasher



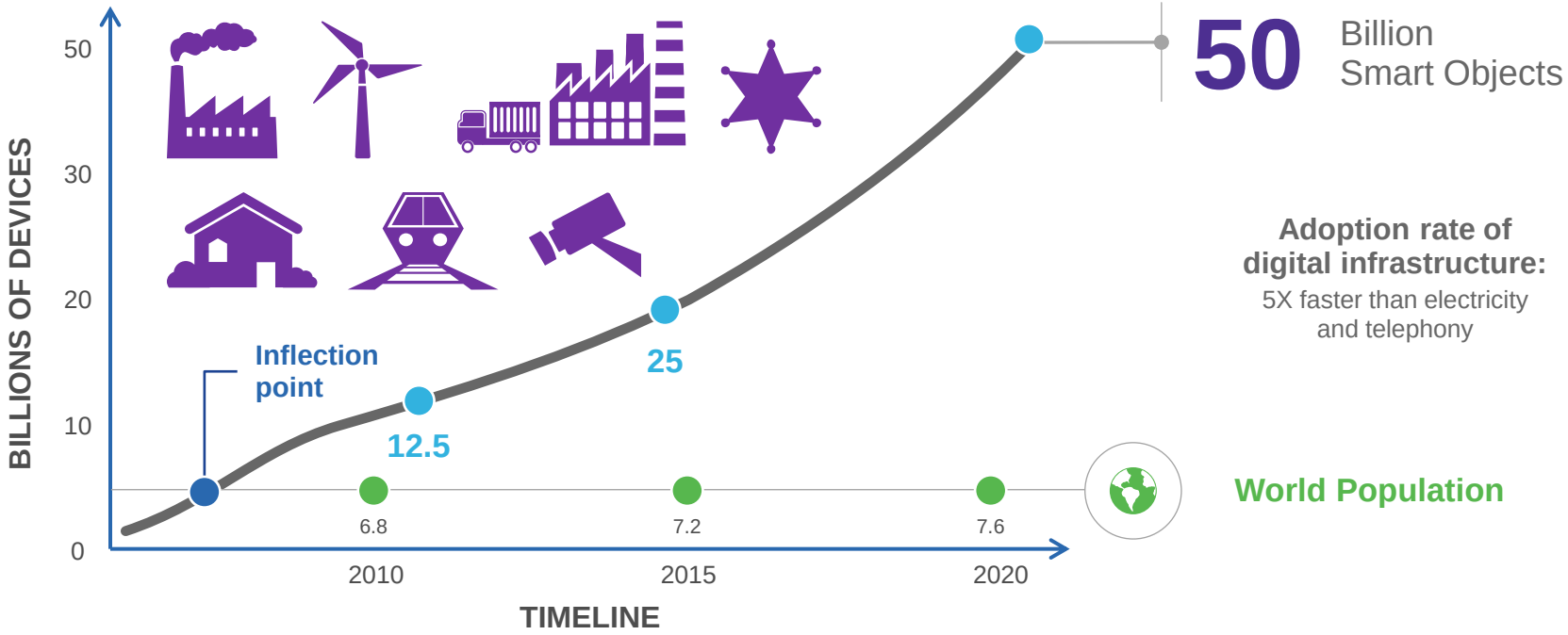


Clothes Washing Machine



Freescale technology

IoT is Here Now – and Growing!



Xerox Remote Interactive Communications - 1987

- Modems added to Copiers and Printers
- Gather and analyze machine diagnostic data
- Preventatively Dispatch Repair Technicians
  - Repair during off peak times

Internet of Things – the Internet

- Uses the Internet Protocol
- May or may not use the public Internet

Internet Toaster - 1990

Sunbeam Deluxe Automatic Radiant Control Toaster

- Interop Tradeshow Floor
- Internet Protocol Toaster
- by John Romkey and Simon Hacket
- Toasted Bread with doneness control via network

Internet Protocol Suite “Narrow Waist”

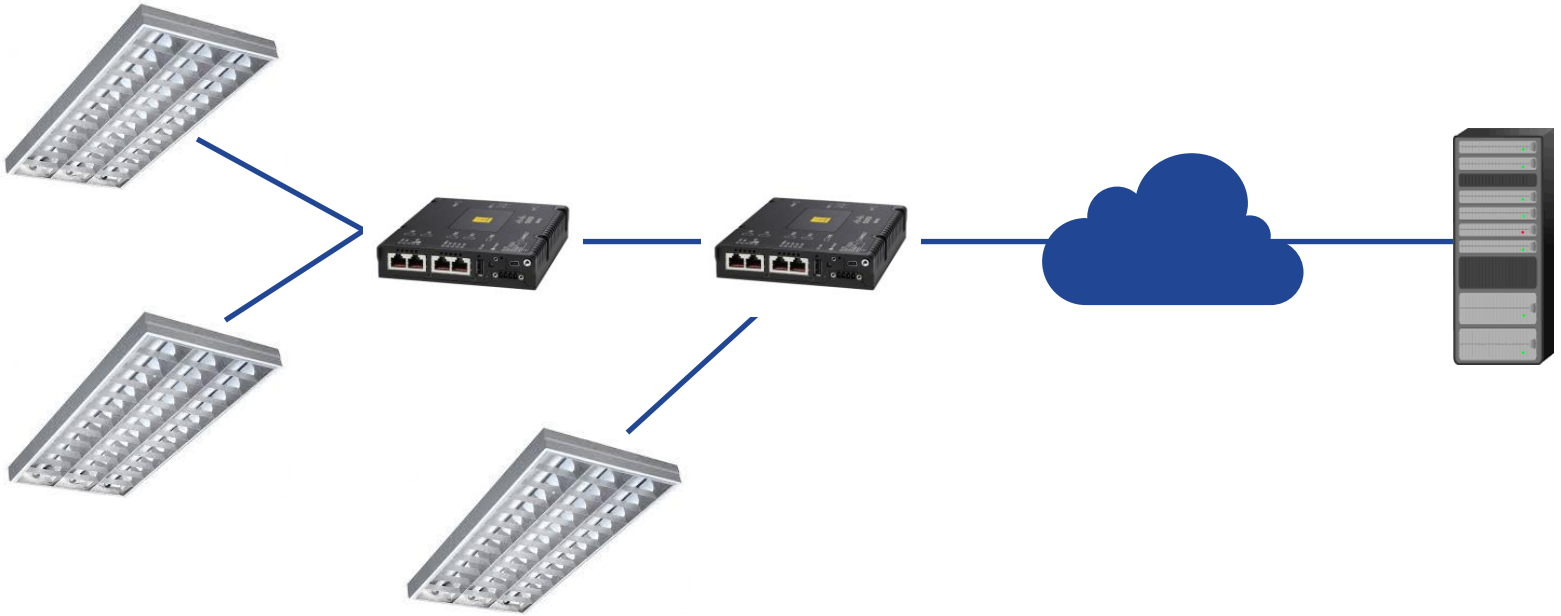
Millions of schemas and other applications

HTTP1.1 HTTP2.0 MQTT CoAP SNMP

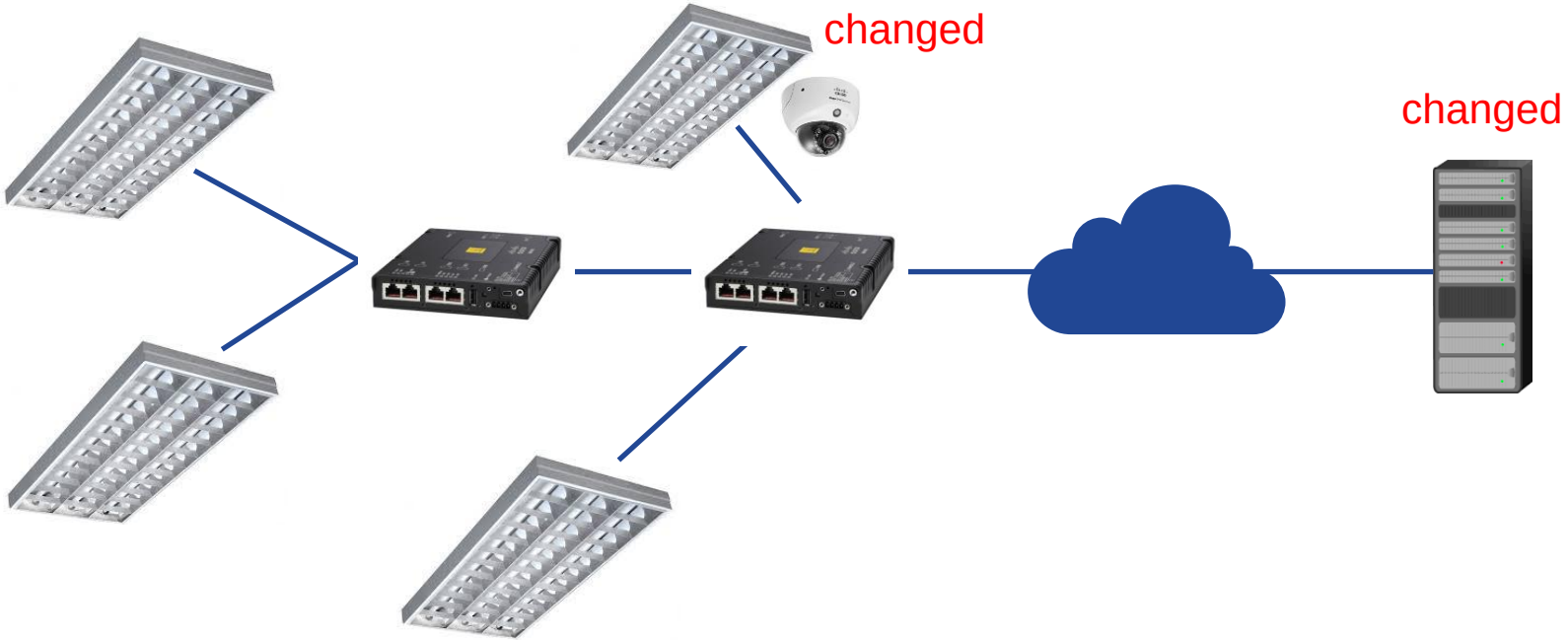
Internet Protocol

WIFI, Ethernet, Cellular

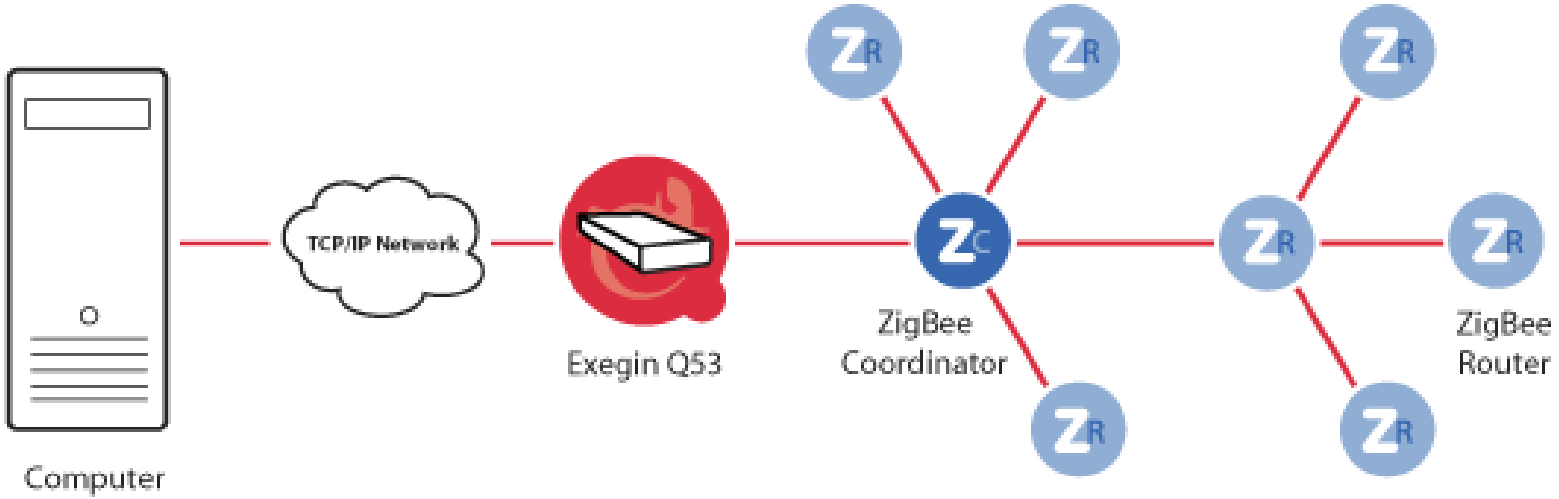
IP Network



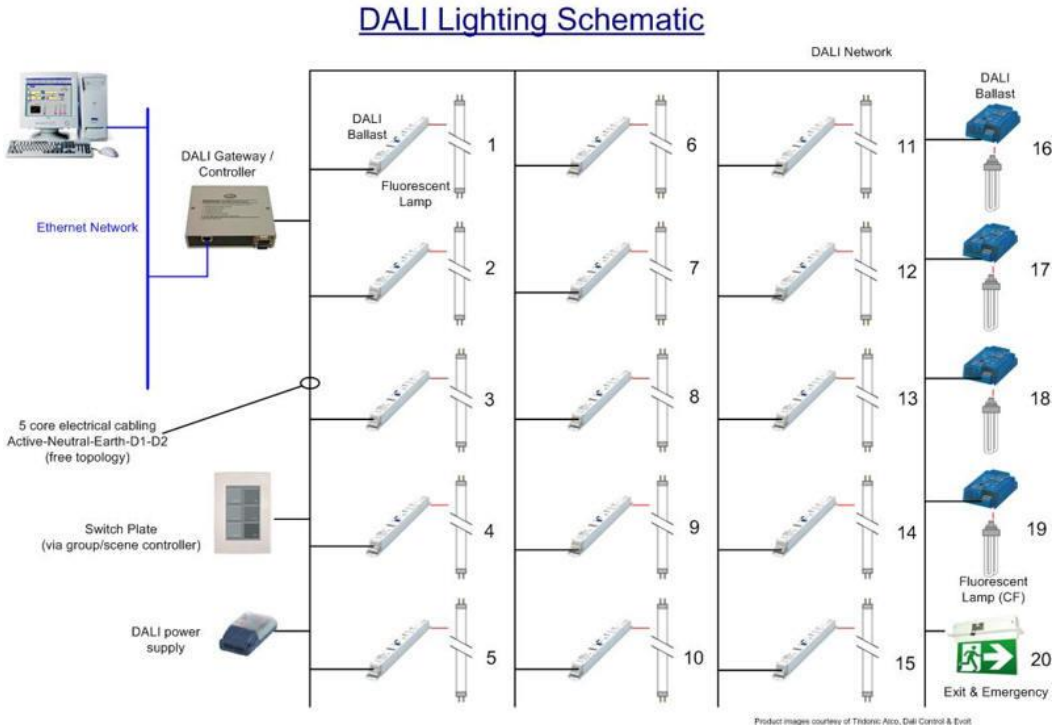
IP Network – new application - infrastructure unchanged



ZigBee Gateway



DALI Gateway



IP Gateway per DALI Fixture

+

Passive Devices

Bar Code

QR Code

RFID Tags

Active Tags

IoT Rock

IPv4 or IPv6

IPv4

- Easier integration with legacy systems
- Short lived Assets (1-3 years)

IPv6

- Able to uniquely identify more system
- Long lived Assets (3+ year)

Dual Stack

- Both IPv4 and IPv6
- Requires more resources

Time – Network Time Protocol

1 ms

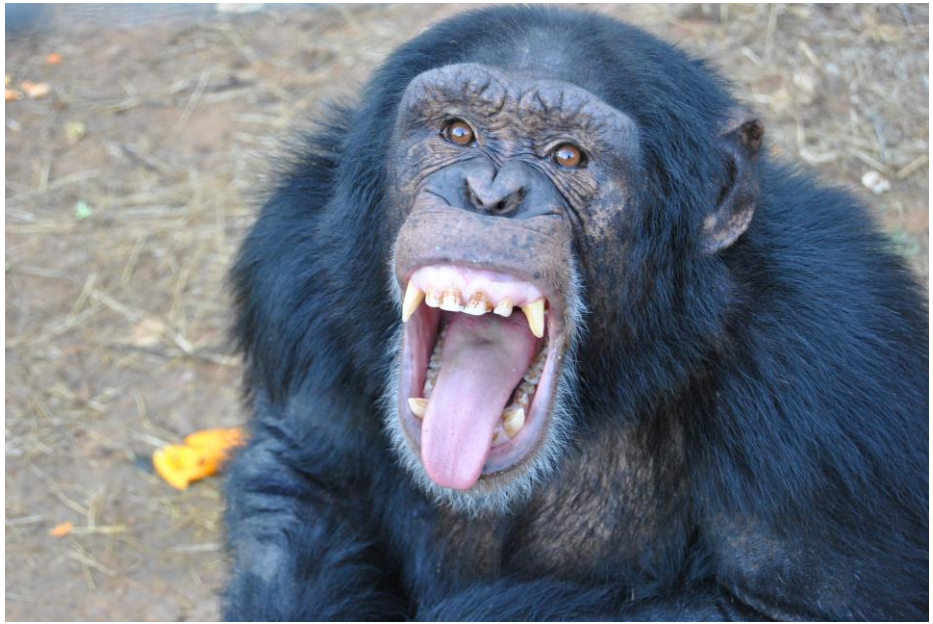
IoT Cloud

Many IoT application focused on cloud

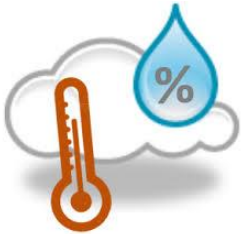
Premises/Edge Processing

Real Time Response
Mission Critical
Data Reduction & Buffering for Cloud

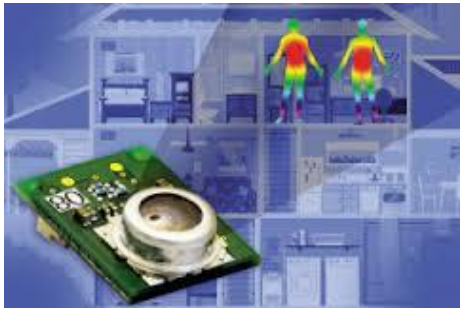
Why would I want to do that?



Fine Grain Usage and Sensor Data

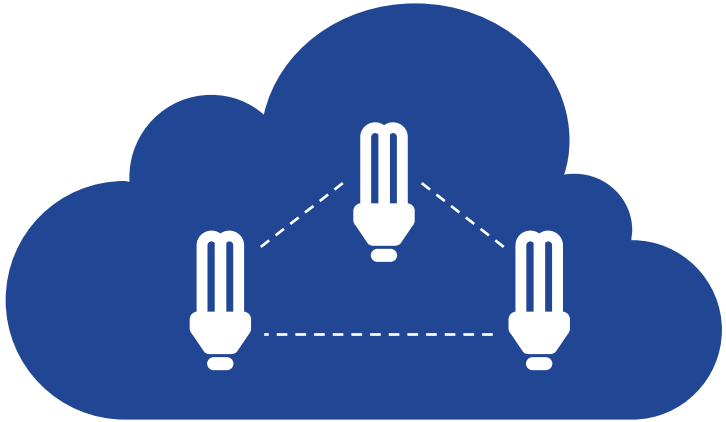


Presence



Lighting Cloud

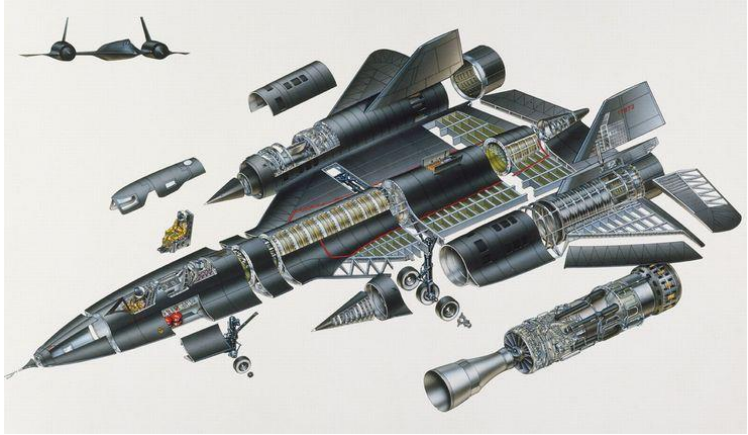
- Storage
  - Sensor Data
  - Utilization Data
    - Energy Consumption
- General Policy
- Device Lifecycle



Video Analytics

Advanced Experiences Deconstructed

Control Software
Networked Enabled Distributed Computing
Mass Customization
Ability to Change – Even on a Deployed System



New Experiences

Control Individual LED’s

Reducing Impediments to Innovation

How Would I do that?

Vendors

"With a little help from my friends" - Lennon-McCartney

Industry Alliances and Standards Bodies

Challenges

Security

Security

Cars

Refrigerators

TV’s

Security Cameras

Cost

or

Walled Gardens

Consensus IP Lighting Controls Protocol

Golden Gate NRA, Park Archives, Fort Point Photo Collection, GOGA-2042

TOMORROW starts here.