

Essential Qualities to Have, Share or Acquire for Successful Commercial or Consumer IoT Applications

Kris Ardis – Executive Director of Microcontrollers and Security BU

Maxim Integrated

The IoT?



A modern living room with a large blue semi-transparent text overlay. The room features a dark leather sofa, a coffee table with a vase of flowers, and a television mounted on a dark wood wall. Large windows with white curtains are visible in the background.

Forget the definitions

The IoT movement is giving voice to the things around us

They inherently “know” things about us because of our normal interactions with them

They have an “invisible intelligence”

Principles of Invisible Intelligence

Maintain our interactions

Superficially similar

Value in the data

Things enabled by technology should not have fundamentally different interactions with us

Principles of Invisible Intelligence

Maintain our interactions

Superficially similar

Value in the data



Principles of Invisible Intelligence

Maintain our interactions

Superficially similar

Value in the data

We shouldn't notice a smart device is fundamentally different from a 'dumb' one

Principles of Invisible Intelligence

Maintain our interactions

Superficially similar

Value in the data



Principles of Invisible Intelligence

Maintain our interactions

Superficially similar

Value in the data

The data we get out of it must have value,
since the smarter device will be more expensive

Principles of Invisible Intelligence

Maintain our interactions

Superficially similar

Value in the data



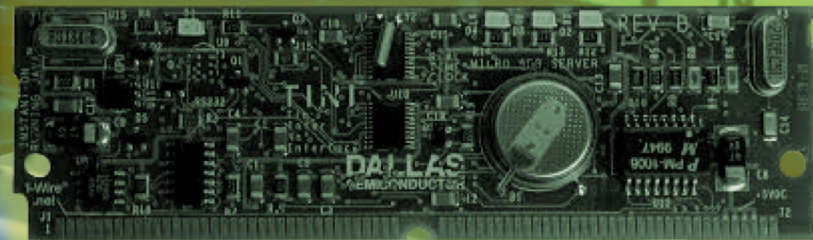
“It doesn't take much imagination to see that soon nearly every digital device and appliance will be able to connect to the Internet. Just about everything has a microprocessor these days, so the only trick is adding Internet connectivity.

One of the more interesting ideas I've run across is a board from Dallas Semiconductor (<http://www.dalsemi.com/>) called the "Tiny InterNet Interface" (TINI).

Al Williams
October 1, 2000

”

Apparently The IoT is NOT New

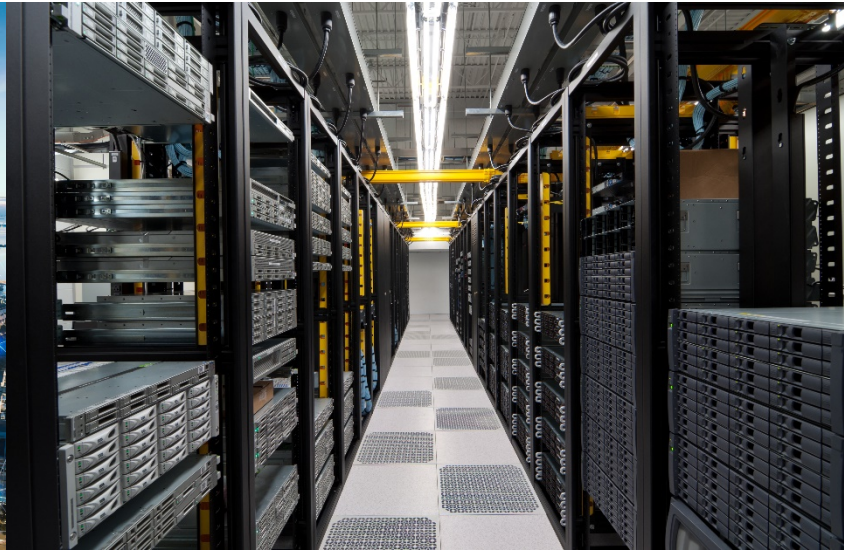


So Why All The Hype NOW?

Technology is enabling more connected devices...



...with access to infinite storage and processing power...



...enabling data scientists to build learning systems.



The IoT Already Has Some Hits: Smart Meters

- Early benefits in truck rolls, enrollment
- Experiments in load balancing, consumer education, load monitoring



Building the IoT

Executing on designs

Defining enduring products

What is Needed to Execute?



Sensor intelligence



Embedded know-how



Network savvy



Cloud fluent

Execution Challenge: Security

Invalid devices
on network

Eavesdropping

Control of
supply chain

Physical
attacks

Device
modification

Feature/usage
limitation

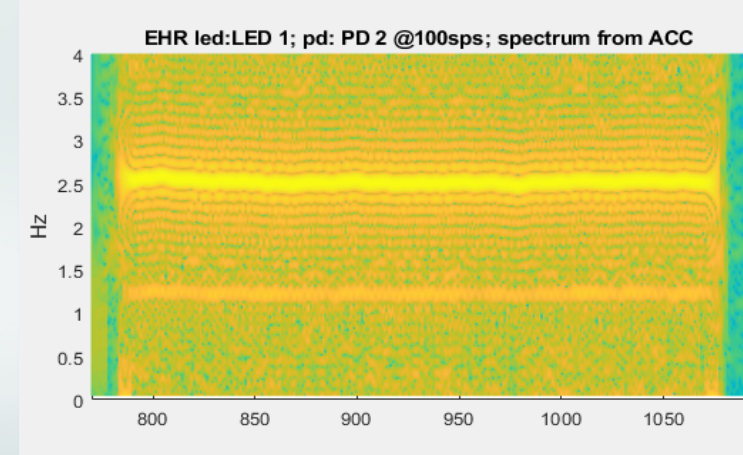
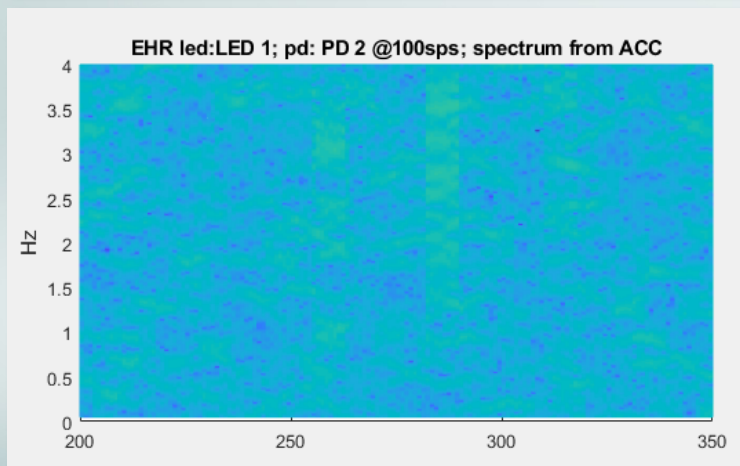
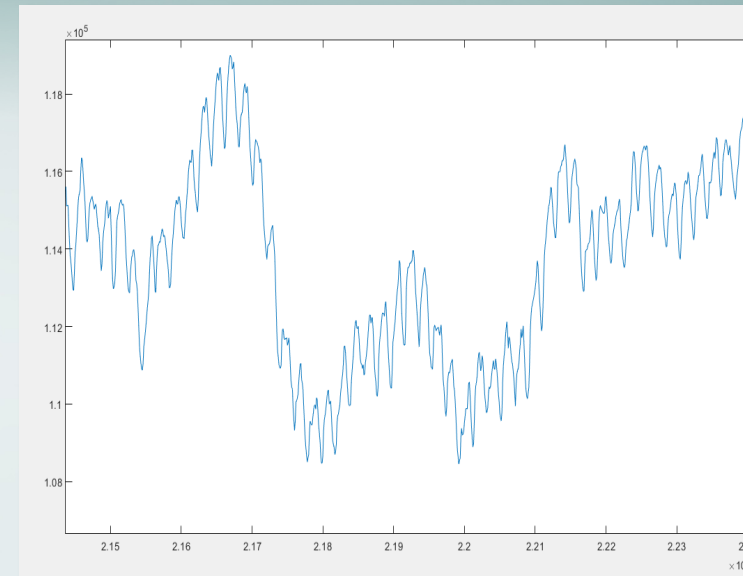
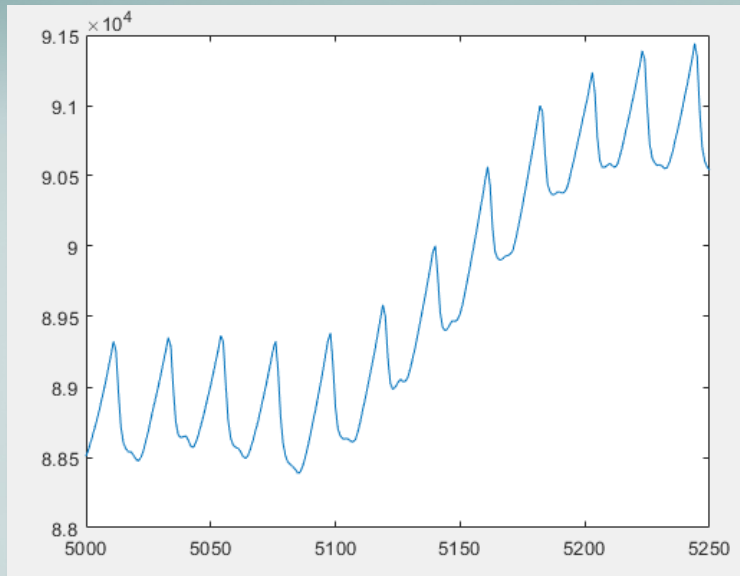
Fraudulent
commands/data

Counterfeit
devices

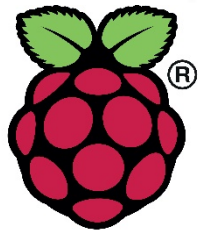
IP/SW theft



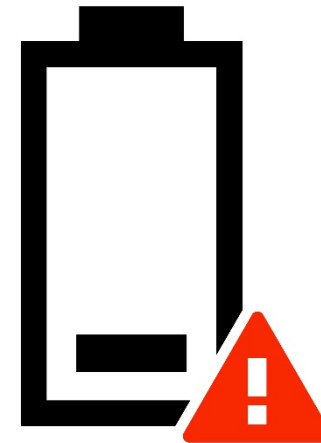
Execution Challenge: Sensors and Algorithm



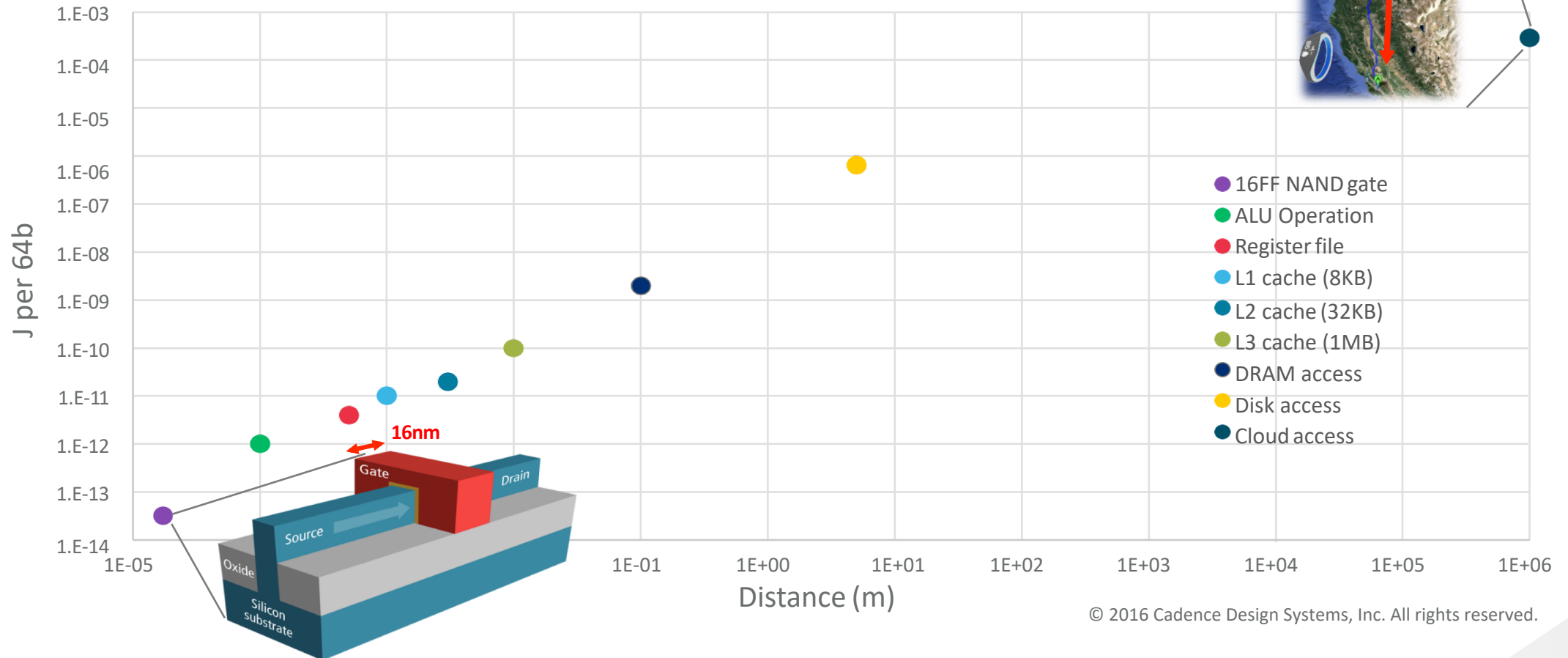
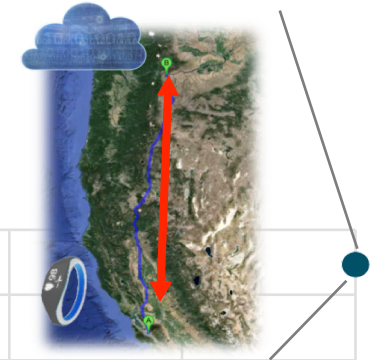
Execution Challenge: What Constraints?



Raspberry Pi



Execution Challenge: Where to Process My Data?



© 2016 Cadence Design Systems, Inc. All rights reserved.

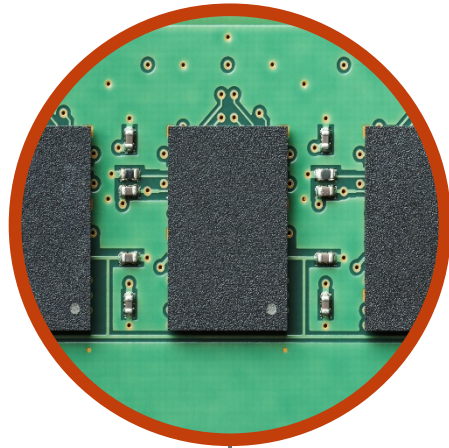
More Importantly...

What is needed to define?

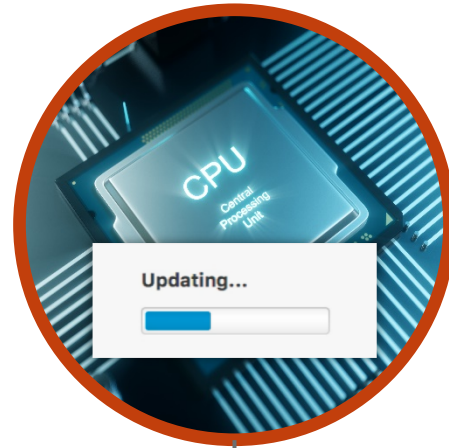




But Some Best Practices...



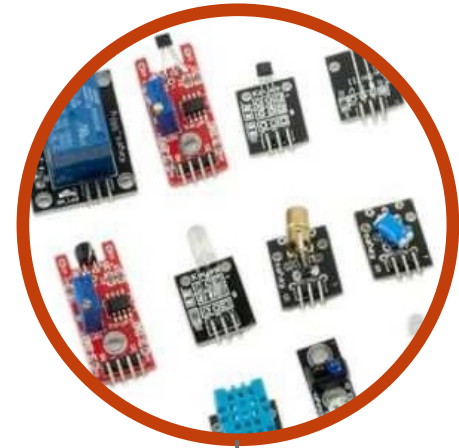
Extra headroom



Reprogrammable



Security



Sensors

...in The Real World

French utility



Street lights



Water meters



Common Themes in Compelling IoT Applications

Business case:
Balanced return



Consumer acceptance:
Invisible intelligence



But What Do I Really Hope the IoT is?



Today: Beer Kegs

\$20B/year sold on tap

160M+: “Sorry, we’re out” ☹️

20% beer wasted in each keg

Tomorrow: Beer Kegs



Smart Beer Keg

Immediate RoI



Home Run RoI



Invisibly Intelligent



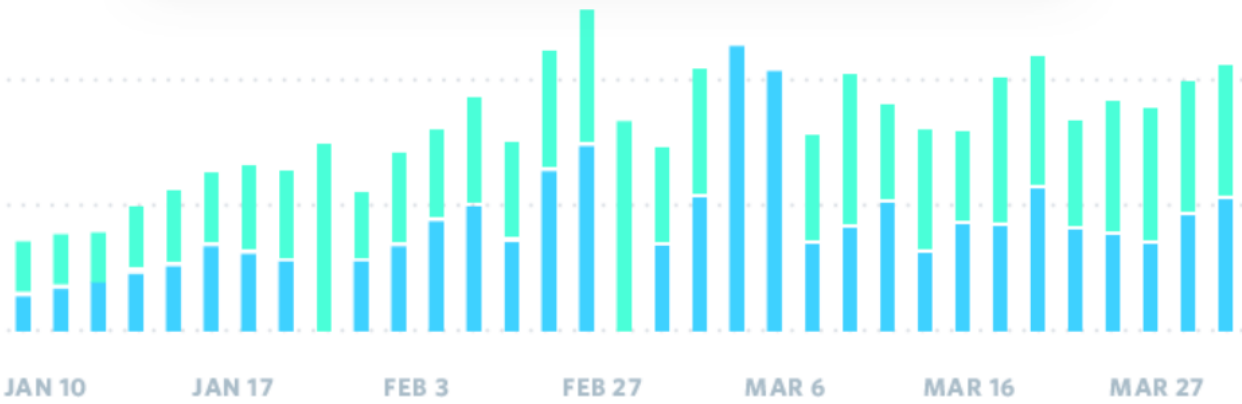
Today: Liquor Pours



Tomorrow: Liquor Pours



ITEM	SOLD	POURED	LOSS
● FOUR ROSES OLD FASHIONED CHECK #5117 JOE	2 OZ @21:22	3 OZ @21:19	1 OZ



Smart Liquor Pours

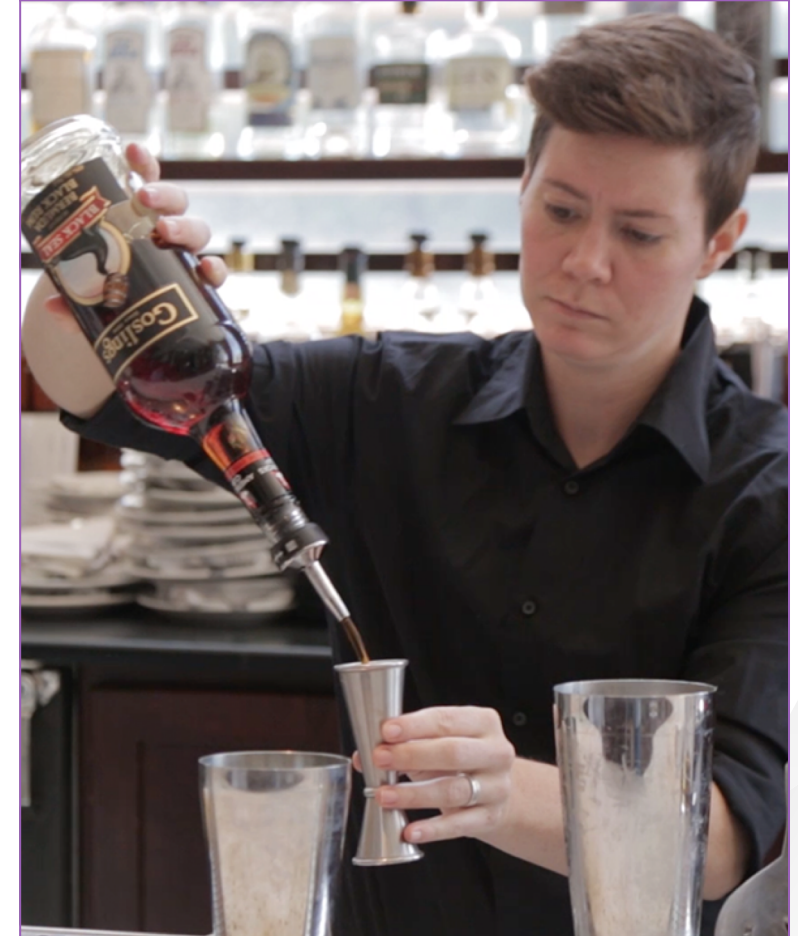
Immediate ROI



Home Run ROI



Invisibly Intelligent



But It's Not All Fun And Games...

**Someone Needs to Get Clean Water for Our Beer,
Wine, and Liquor!**

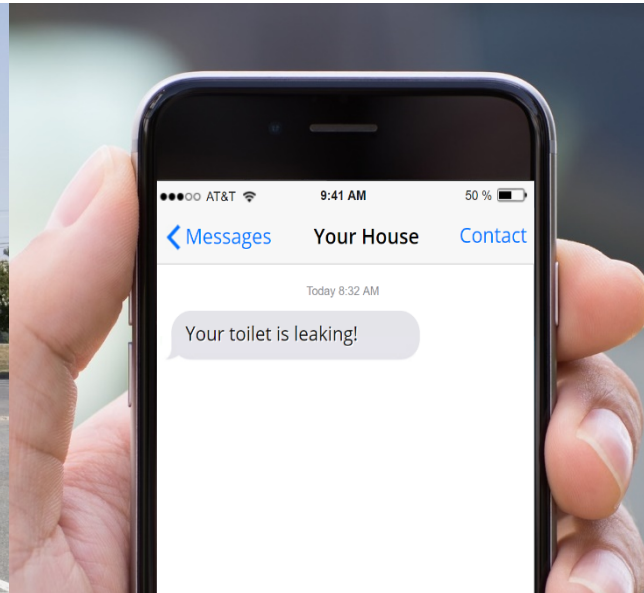
Today: Water Metering



Tomorrow: Intelligent Water Metering



Intelligent Water Meters



A Cautionary IoT Tale: How Could This Fail???



A Cautionary IoT Tale: Why Didn't' TINI Work?

Business case:
Balanced return



Consumer acceptance:
Invisible intelligence



