Applications of
The Internet of Things

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We need to empower computers with their own means of gathering information, so they can see, hear and smell the world for themselves, in all its random glory.

Kevin Ashton, RFID Journal, June 2009

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The Internet of Things is Small

- Small Microprocessors

- Small Sensors

- Small amounts of memory

- Small messages

- Small antennas

- Small wireless transactions

The Internet of Things is Big

Your **microwave oven**, washer, **dryer**, dishwasher, **coffee maker**, refrigerator, **VCR**, television, **video game console**, stereo receiver, **CD player**, DVD player, **remote controls**, garage door openers, **sprinkler systems**, phones, **answering machines**.

The Cliché of the Connected Fridge

- It knows what you put in

- And what you take out

- It will tell you when you run low

- It can order more food for you

- Your fridge knows how healthy you are

The Reality of the Connected Fridge

- Commercial & Industrial Refrigerators

- Every shop, warehouse, & commercial kitchen

- Critical to the safety of the food system

- Governments are starting to regulate them

- IoT "connected fridge" will save time & money

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Heating Houses & Buildings

- Major use of Electricity & Gas

- Very uneconomic & unscientific use

- Can we do this better with IoT?

The Common Thermostat

- Requires daily human intervention

- Relies on limited data

- Works sometimes, approximately

- Nest IoT thermostat learns behaviour

- Acquired by Google for a billion dollars

Utilities: Smart Metering is IoT

- Mechanical meters have no power

- Frequently have no sunlight

- Hard for humans to read & maintain

- New batteries & wireless solve problems

Utilities: IoT for Infrastructure

- Not just for automated meter reading

- Transformers last 20+ years

- Take them out too early, you lose money

- Leave them in too long, they fail in place

- Monitor their temperature & voltages with IoT!
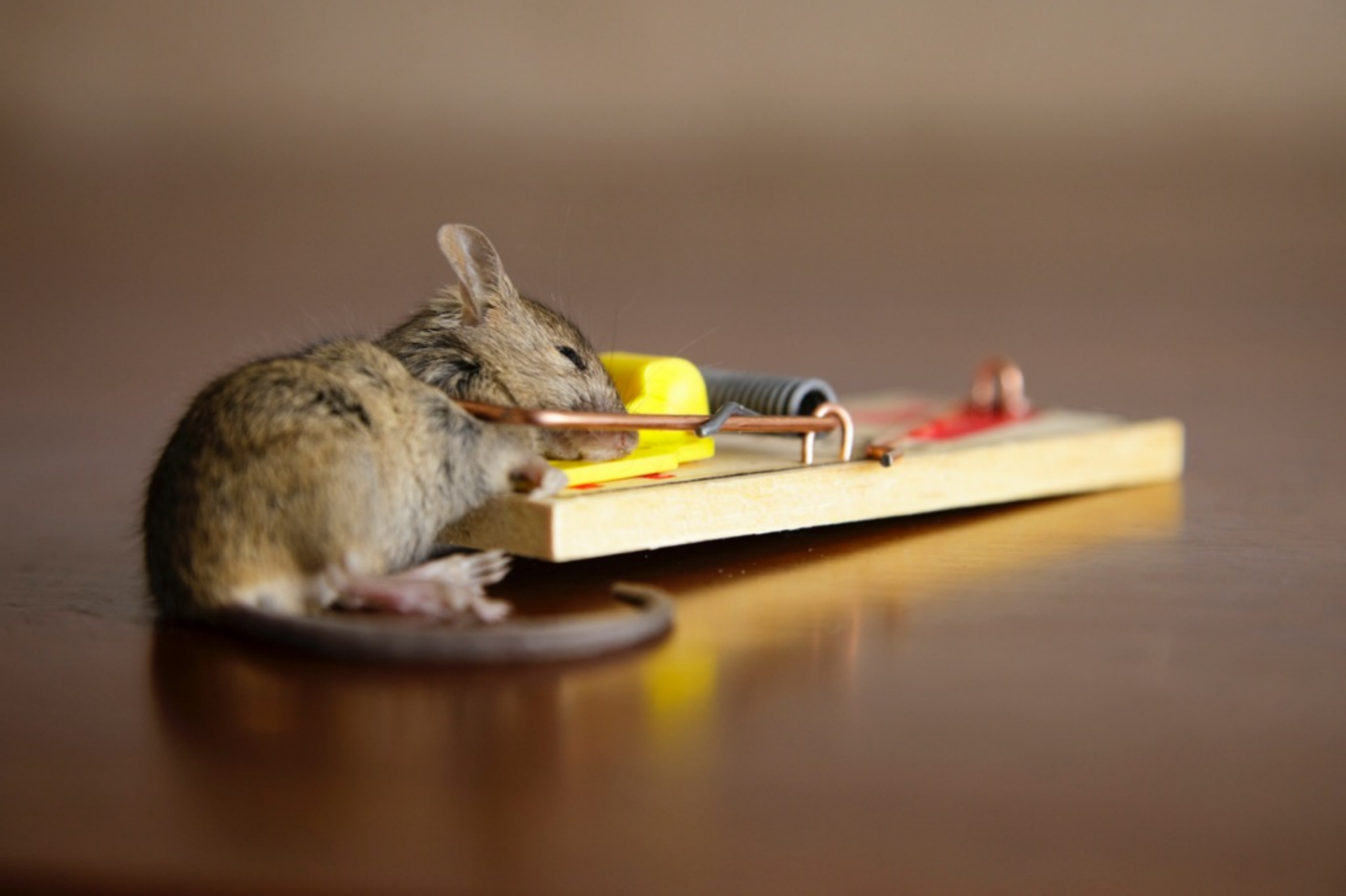
Retail & Food: IoT for Safety & Compliance

- Traps are under shelves, behind counters, in the dark

- UK law says clear traps within 24 hours

- Supermarket employees spent a lot of time checking

- Neul (Huawei) & Rentokil designed an IoT mousetrap

- Saves hours of employee time every day

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City Maintenance: IoT Saves Time & Money

- Smart trash cans in Milton Keynes

- City employees used to check them every day

- Now sensors alert the city to full trash cans

- Saves time, diesel fuel, people hours

City Maintenance: IoT Saves Time & Money

- Streetlights are on light sensors or timers

- They only turn on at night

- Check, at night, to see if they're working

- Or wait for a report from the public

- Inexpensive IoT sensor solves this problem!

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IoT for Traffic Management

- What does parking have to do with traffic?

- Better parking information, less driving around

- less driving around = less traffic!

- Garages can display number of free parks

- IoT light sensors can help

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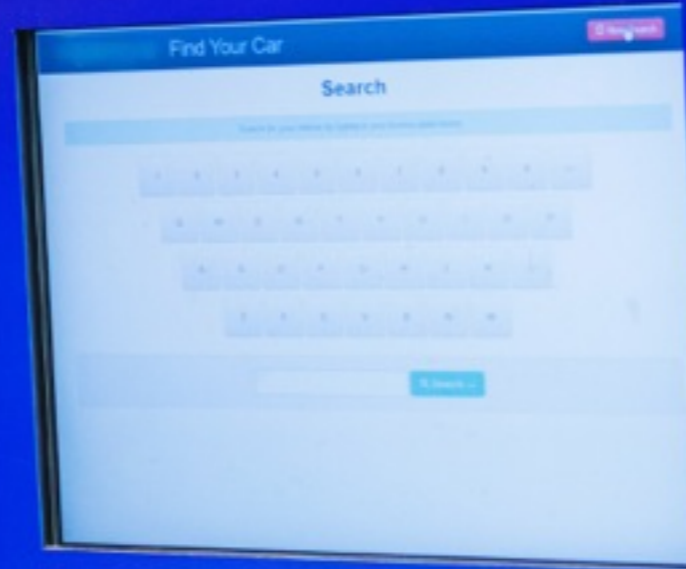
IoT for Shipping Containers

- What's in that container?

- Timber? Milk Powder? Coffee? Electronics?

- Can it get hot? Damp? Can it be shaken?

- IoT Sensors can record conditions

- Assurance for customers of proper shipping

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IoT for Tracking Containers

- Where's your container?

- Tracking used to be thousands of dollars

- GSM tracking now < $100

- Satellite tracking < $500

- If tracked, use for sensor telemetry too

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IoT for Maritime Safety

- Maritime lights are like streetlights

- Except they're much harder to check!

- IoT can provide assurance lights are working

- Weather data, tide height, tsunami warning

IoT for Pivot Irrigators

- The pivot irrigator enables modern agriculture

- & has helped deplete aquifers around the world

- New irrigators sense dry areas as they roll over

- & vary nozzle size to deliver more or less water

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IoT for Drip Irrigation

- Soil types and drainage varies across fields

- How do you adjust on a granular level?

- New moisture sensors will enable high detail

- Water savings can come at the drip level

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IoT for Greenhouses

- Water delivery: where, when, and how much

- Heating and ventilation with precision

- IoT drops the cost of industrial systems

- Opens fine control for developing markets

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IoT for Water Tanks

- Water Storage is important for farms

- Checking tanks a manual process: hours per week

- Fail to check tanks, livestock can die

- < $100 for tank monitor w/ solar + 3g

- < $200 for tank monitor w/ solar + satellite

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IoT for Water Tanks

- Water tanks help where supply intermittent

- NextDrop in India texts when water will be on

- IoT meters can tell users when they'll run out

- Connected meters can tell cities about supply

- What neighbourhoods need water today?

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IoT for Water Delivery

- Water runs out!

- Trucks deliver more

- Where and when should the trucks go?

- Connected meters = less time & fuel

- Connected meters = no running out

- This works for anything in a tank (fuel, feed, etc.)

IoT is Weather & Public Safety

- IoT is inexpensive flood monitoring

- Project NOAH in Philippines = 1,000+ IoT stations

- Know before the floods come

- Know before mudslides & bridge outages

- IoT can save money & save lives

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Thank You!

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