



# Saving energy with Apache Spark and Toon

Stephen Galsworthy, Toon

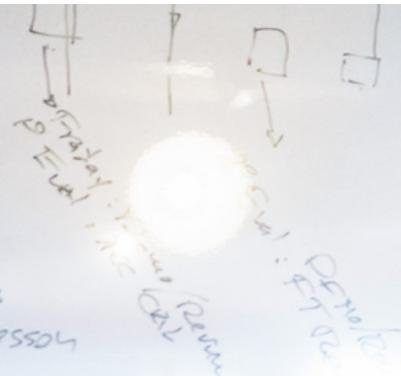
#EUds10 #ToonTalks

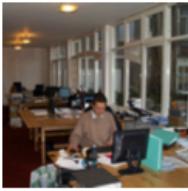
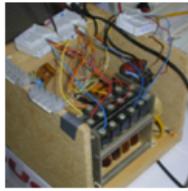
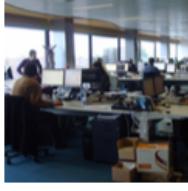
# TOON®



TOON®

- ② + MK: QA release doc.
- ③ : 10/15 New BMod.  
Ac: New Display = MMod.
- ④ : Utility: INFRA TEAM: Robert Maessan  
- Previous / RAN  
- Intermediate CA (so called) Tension prod. displays

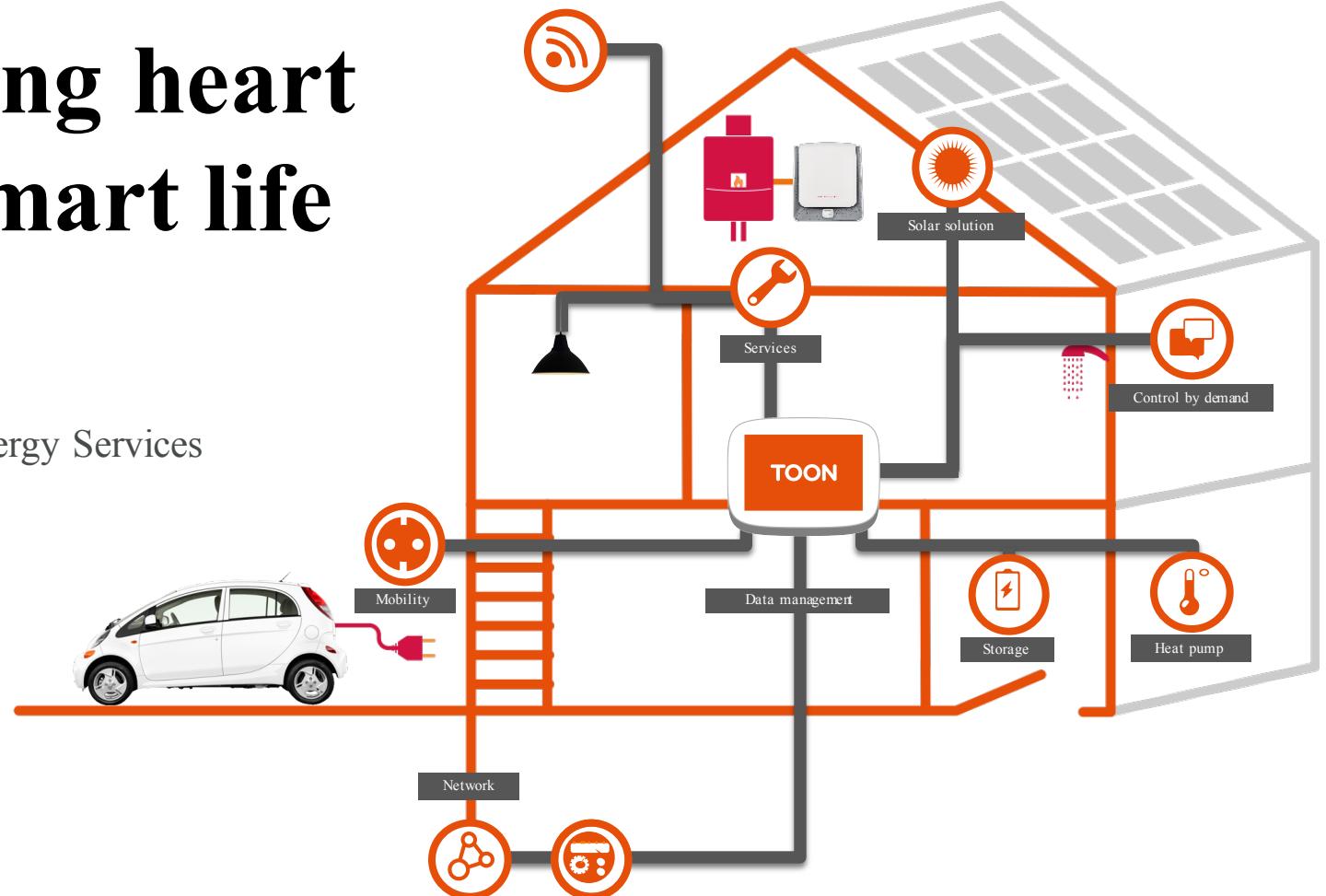


2004	Home Automation Europe is founded	Home control alternatives are prototyped	The shift to smart thermostats	Home Automation Europe becomes Quby	Eneco acquires 100% of Quby's shares	Quby's white label product is rebranded internationally as Toon
2005						
2006						
2007						
2008						
2009						
2010						
2011						
2012						
2013						
2014						
2015						
2016						
2017						
	The Home Control Box is launched	Home Automation Europe moves into a new office		Home Automation Europe partners with Eneco to create Toon		Quby partners with Engie to create Boxx

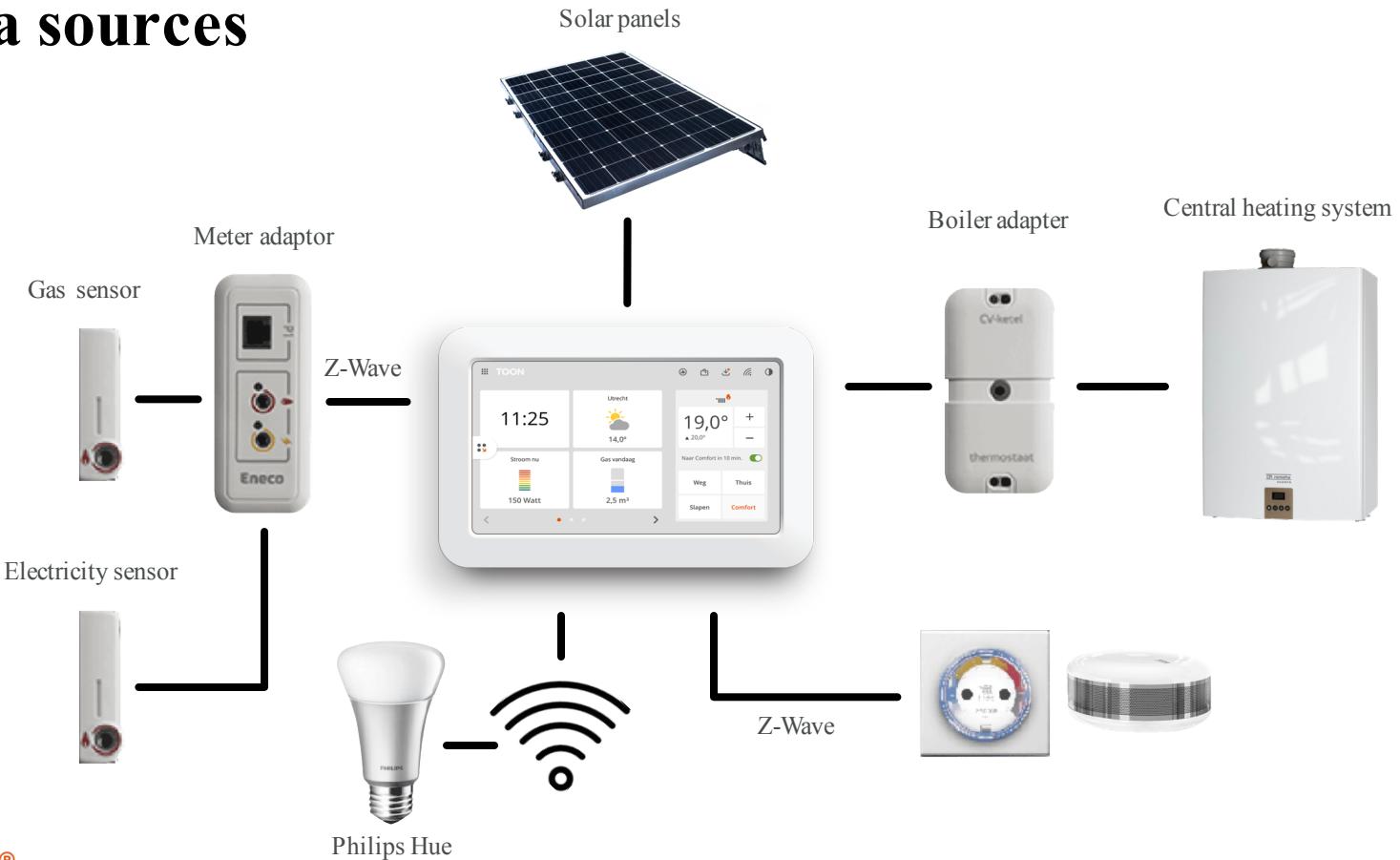
# The beating heart of your smart life

□ Smart Platforms & Energy Services

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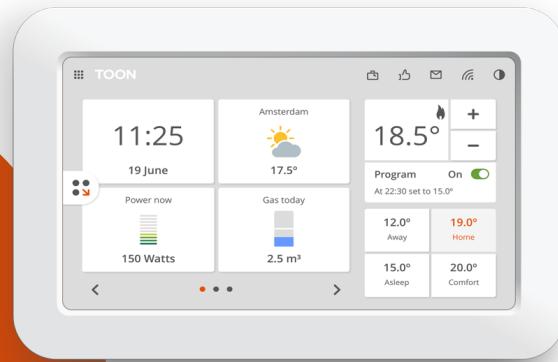
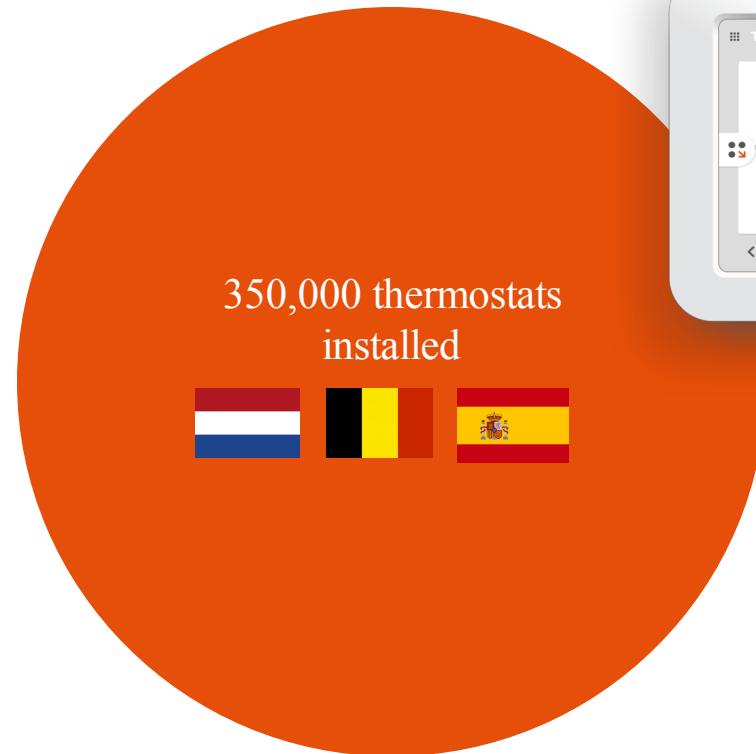
# Toon data sources



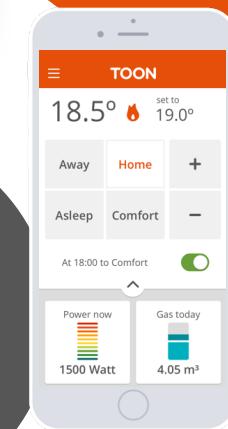
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## Scale of Toon data



300 types of sensor and user interaction data



100 MB data per user collected per month

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## Data Privacy

Data from all Toons is collected and stored anonymously. Data is tagged with an anonymous ID, generated locally on Toon.

The end user maintains control over this key and we only use data in a non-anonymous way when a customer explicitly opts-in.



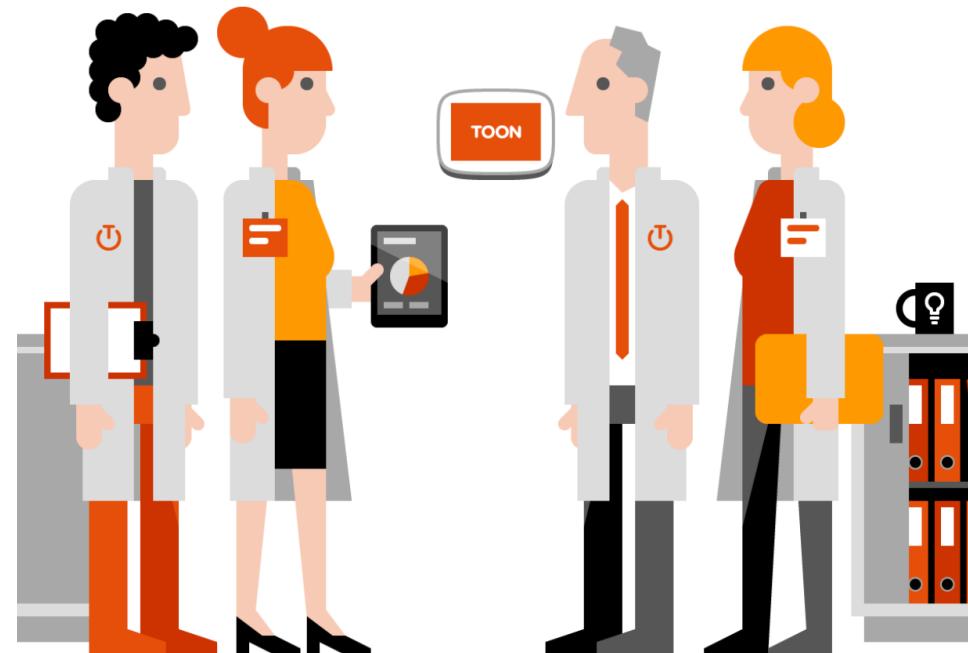
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## Toon Innovators

Innovators agree to share their data for research and product development.

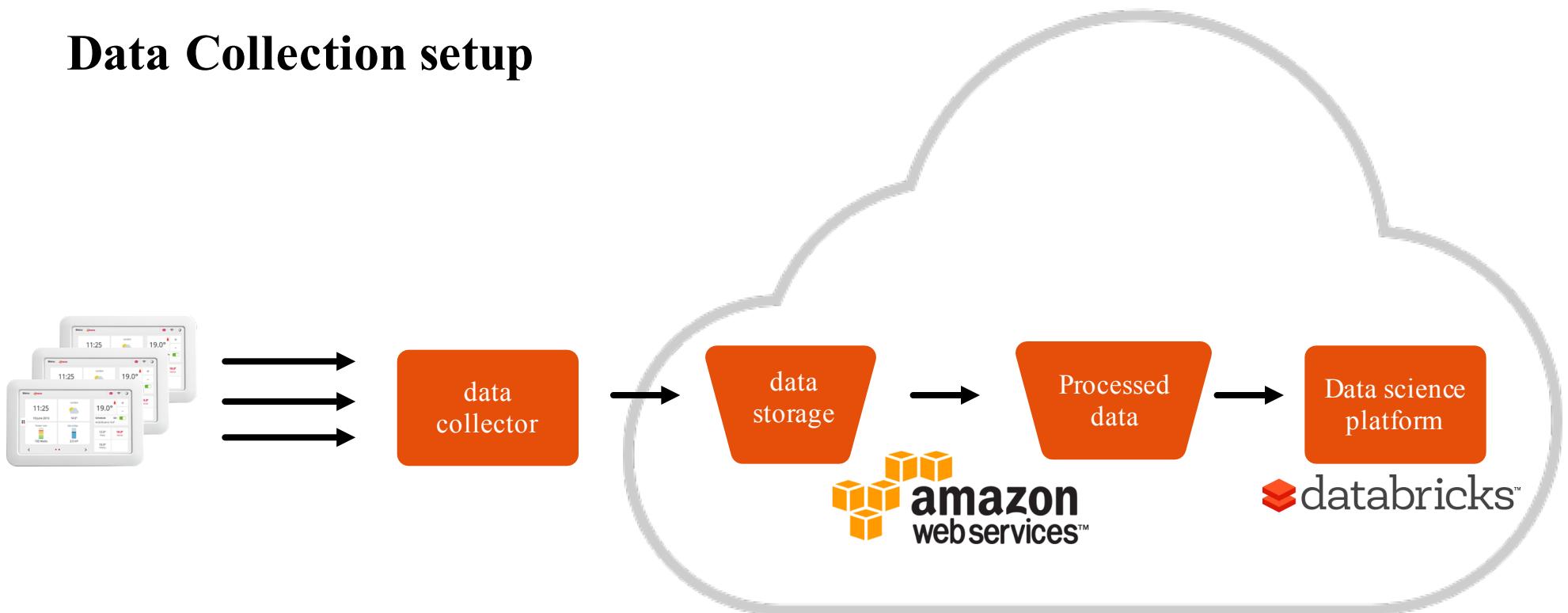
In return they are first in line to try out our new services!



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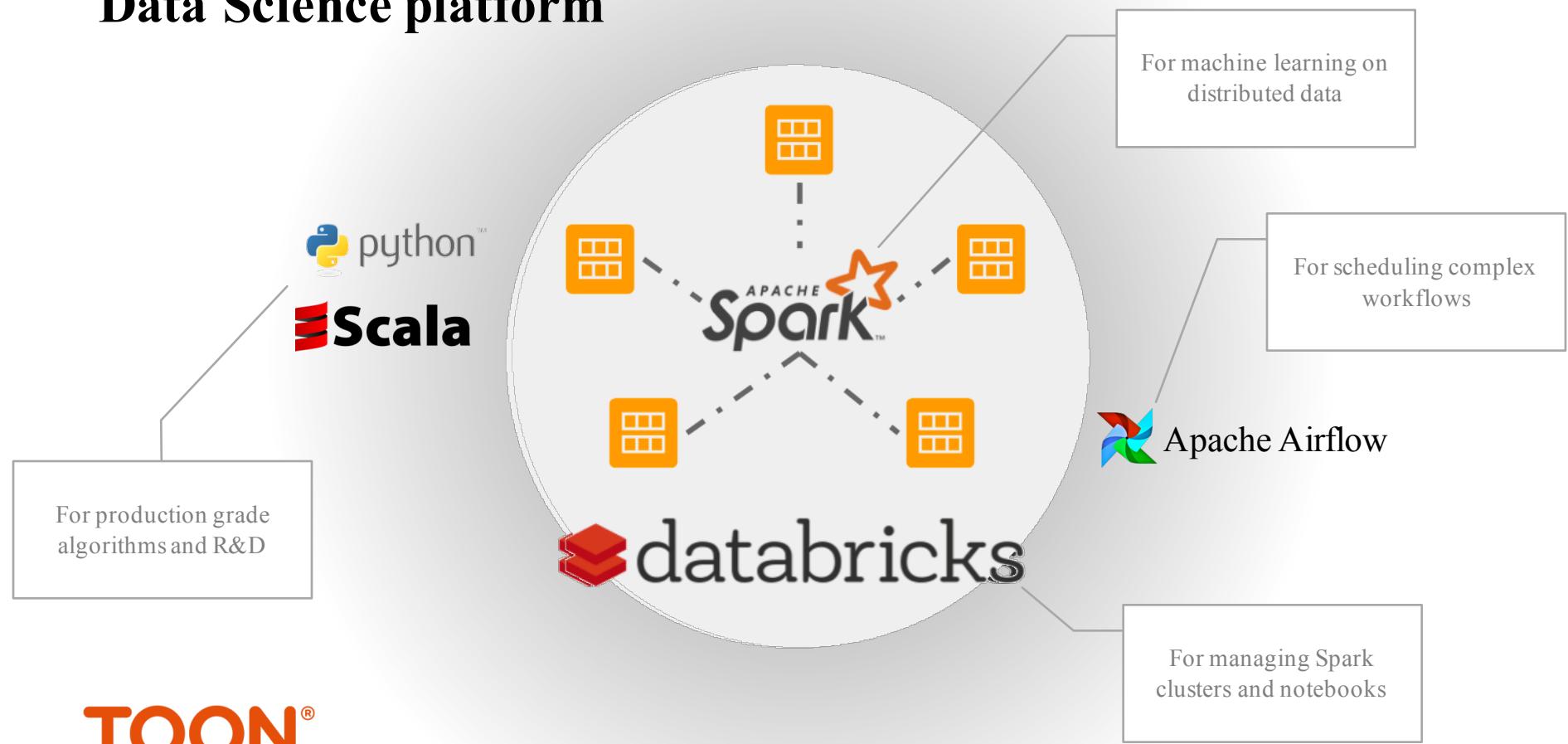
## Data Collection setup



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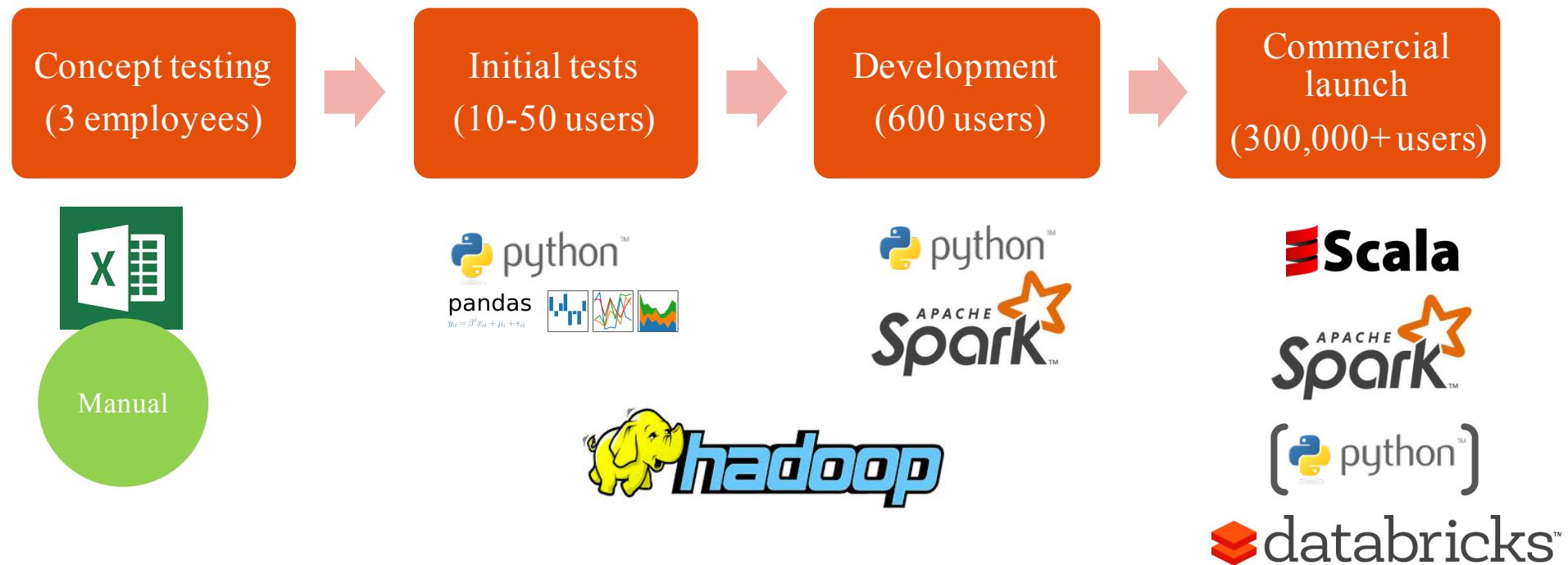
# Data Science platform



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# Our journey



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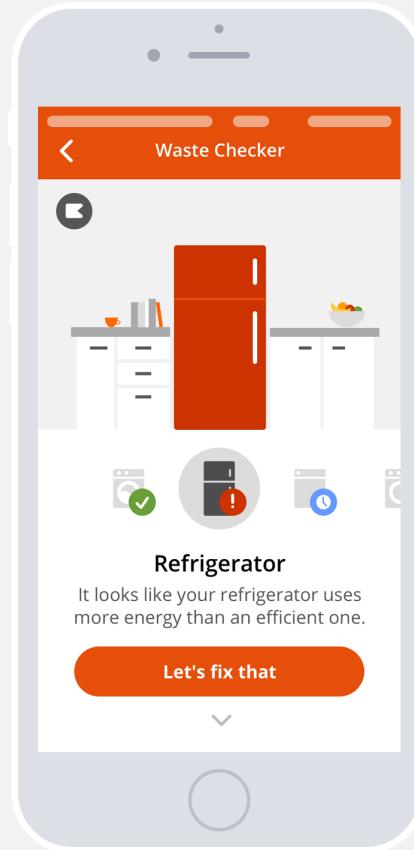
# Data driven services

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# Energy Waste Checker

We don't always notice how much energy we're wasting.

Toon can now expose the energy guzzlers in your home.

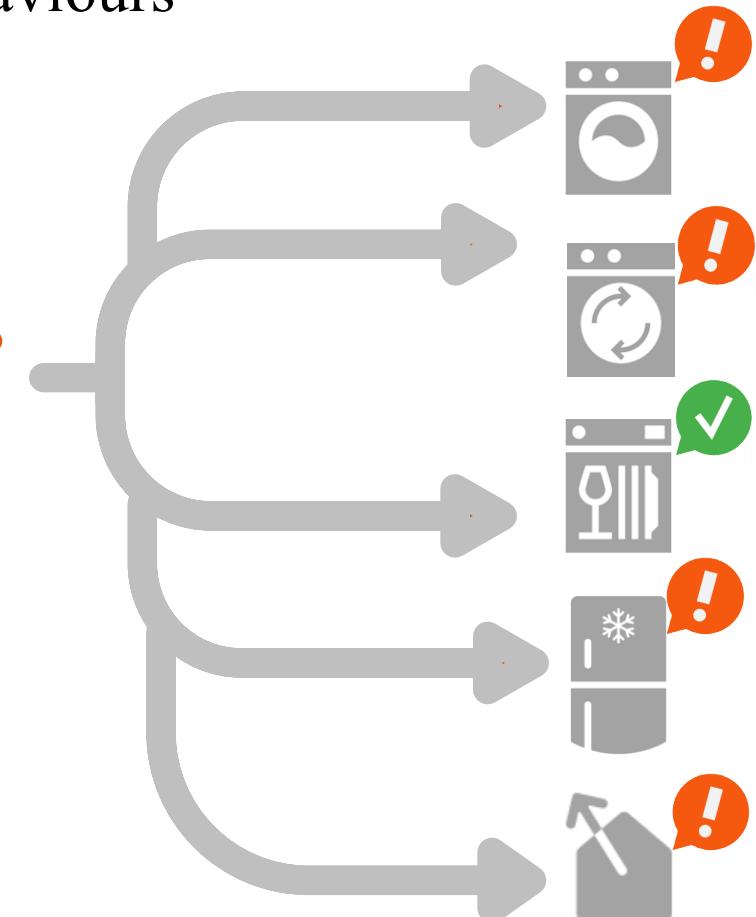


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Toon detects inefficient appliances and behaviours



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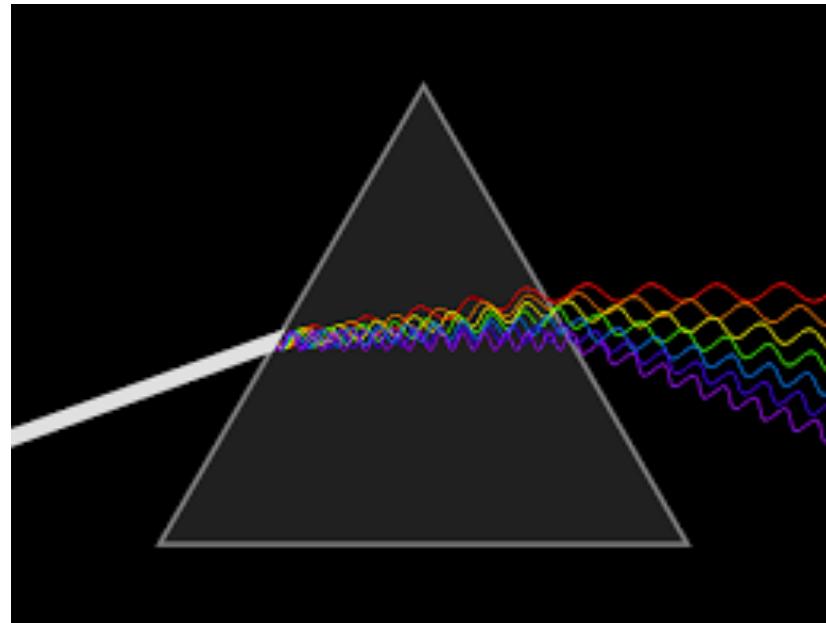


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## An underlying concept: Load disaggregation

Electricity data



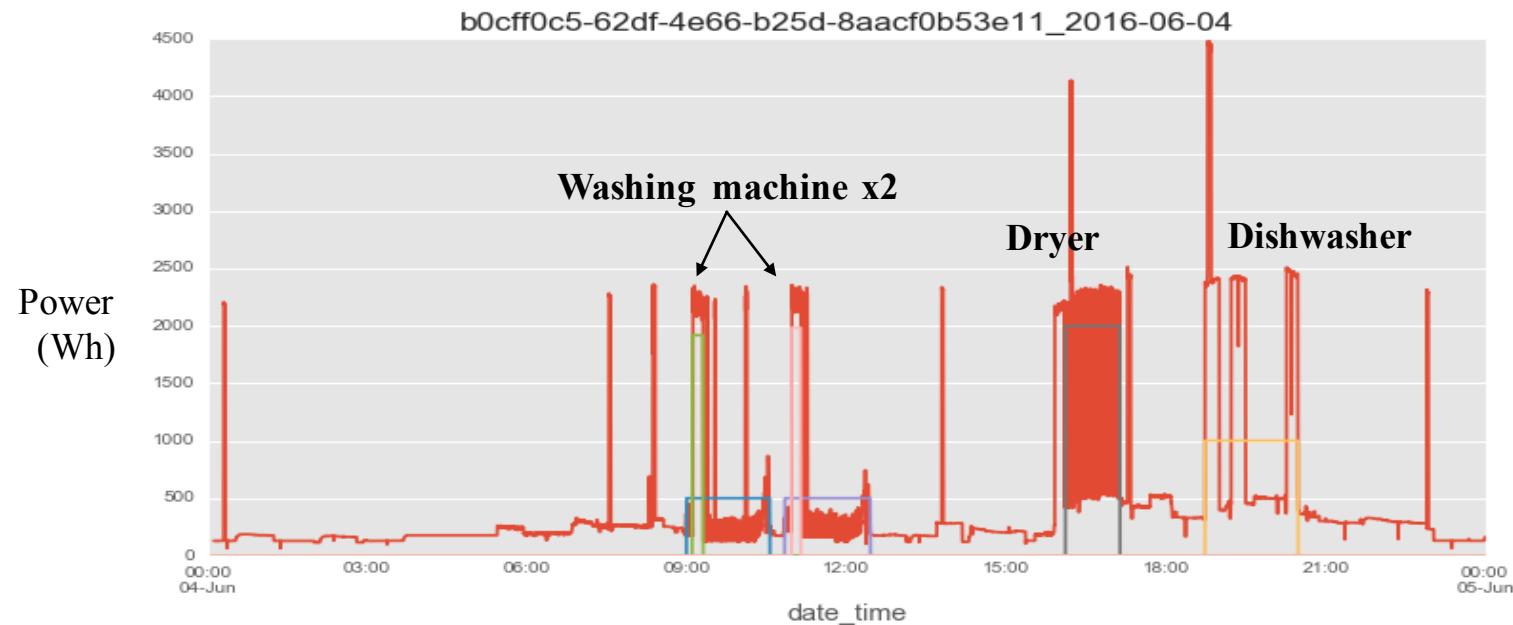
Appliance signals

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# Disaggregation algorithms

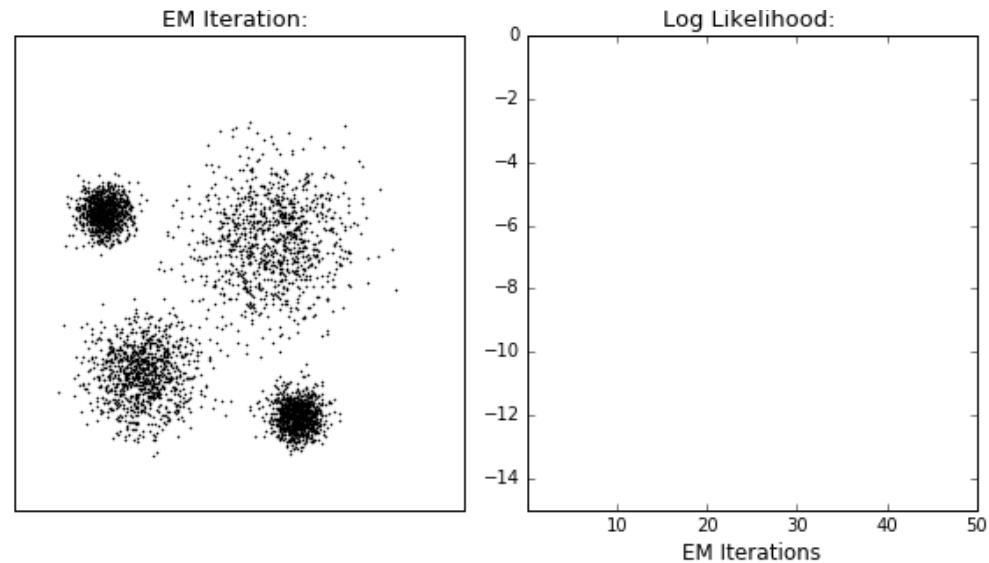
Run on 10s electricity meter data



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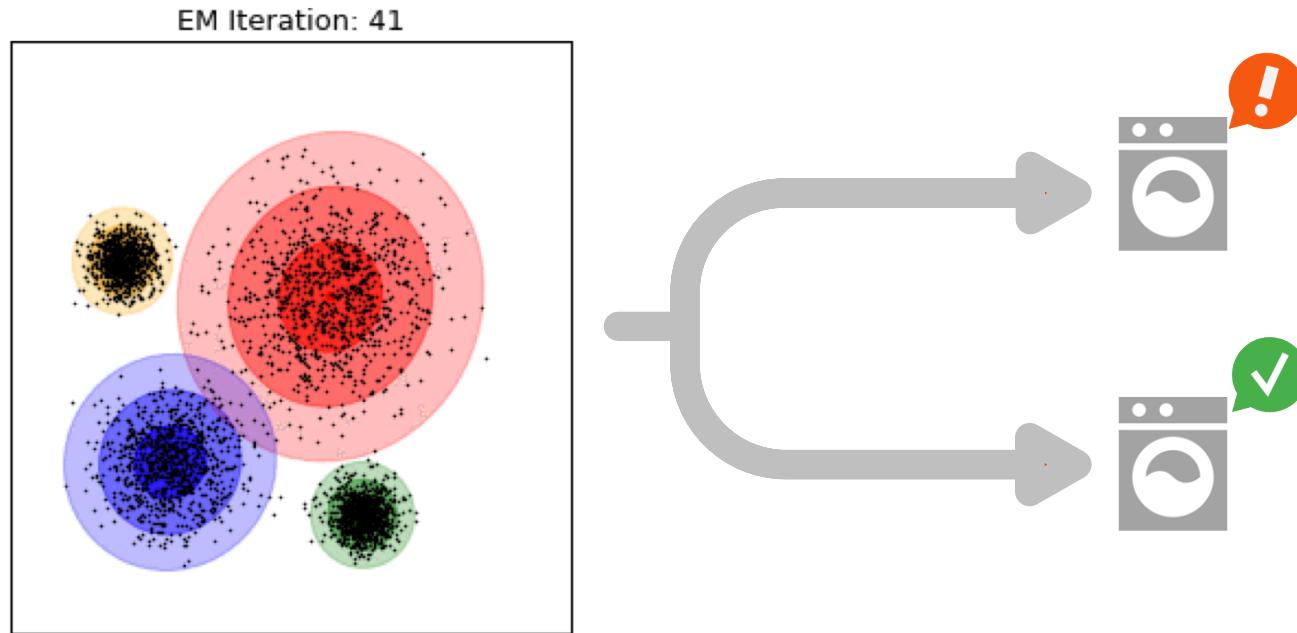
# Determine appliance ‘fingerprint’



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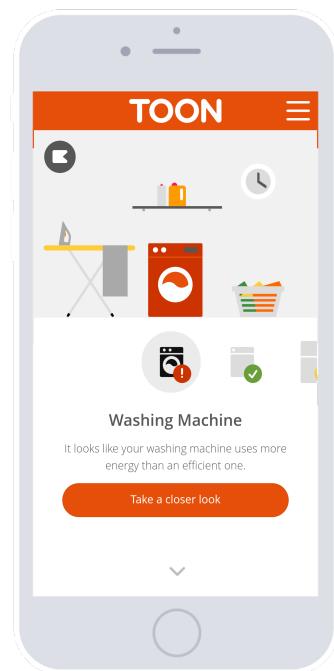
# Efficiency classification



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## Personalised advice for the end user



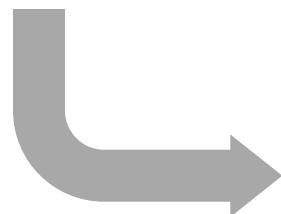
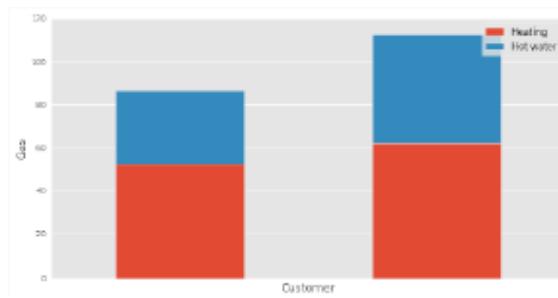
"It looks like your  
washing machine uses  
more energy than an  
efficient one"

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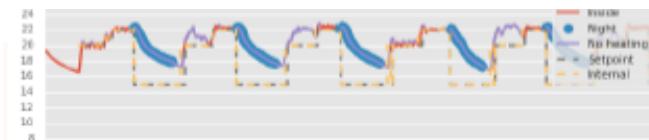
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## Another example: Heating and Insulation advice

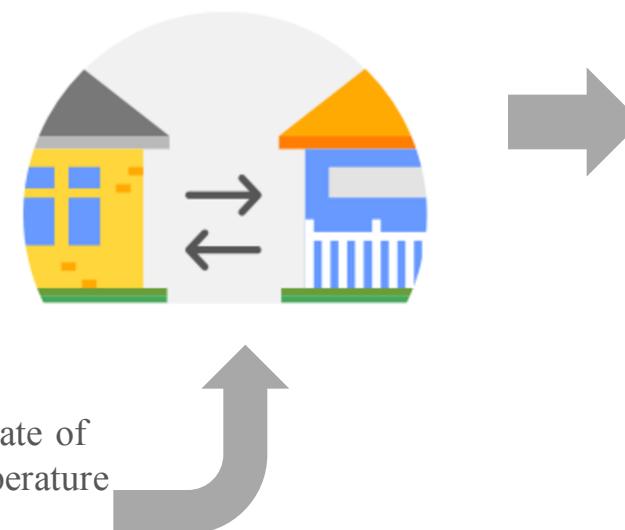
1. Analyse how much gas is used for heating the home



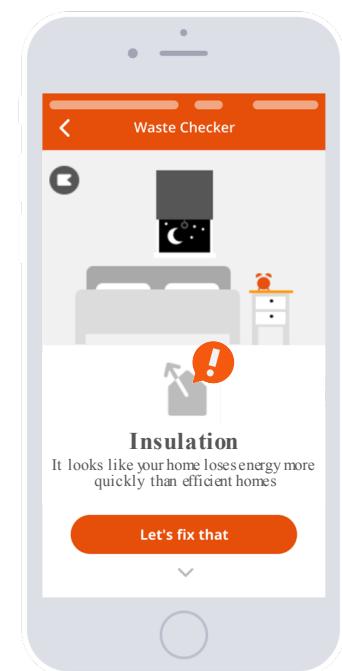
2. Analyse the cooling down rate of the home overnight from temperature data



3. Benchmark with comparable homes



4. Personalised insulation advice for the customer



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## Scale of Toon data



100,000 washing  
machine cycles  
detected per day

35,000,000 washing machine cycles  
detected per year

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## What else is on its way?



### Boiler Monitoring

Toon will keep an eye on your boiler 24 hours per day.

It'll tell you if it's still working correctly and when the next maintenance is due.



### Monthly Energy Insights

A personalised overview of energy usage for all Toon users.

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