Die Zukunft der Energie mit Demand Response, AI, Machine Learning und Big Data

Filippo Ferraris | CPO | Enerbrain

IoT, Big Data & Artificial Intelligence

A step into demand response and «circular energy»

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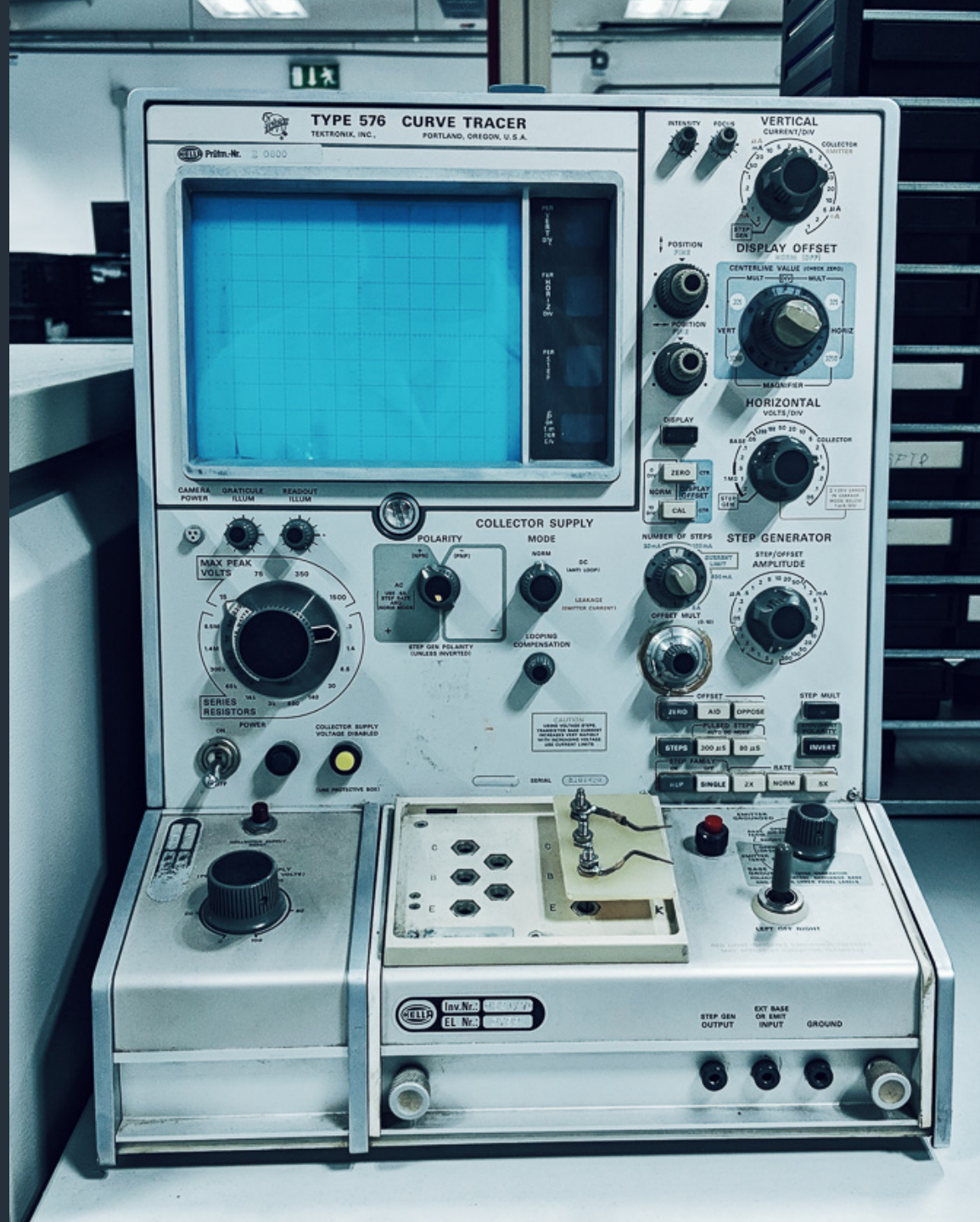
Filippo Ferraris
Chief Product Office @ Enerbrain



what is IoT?

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what is IoT?

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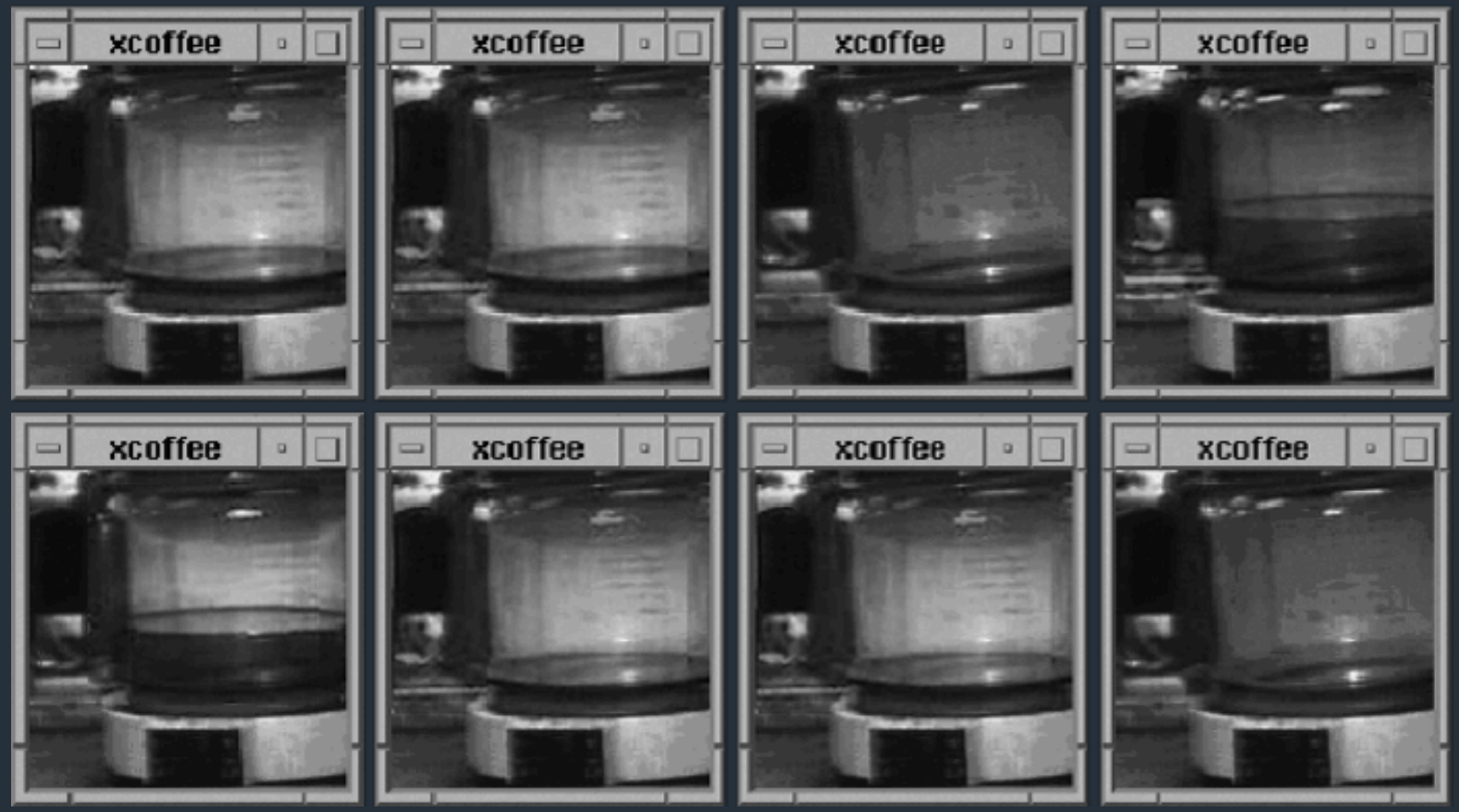
from internet to IoT

1991 - first IoT device



The Trojan Room Coffee Camera
Quentin Stafford-Fraser, Paul Jardetzki - Cambridge

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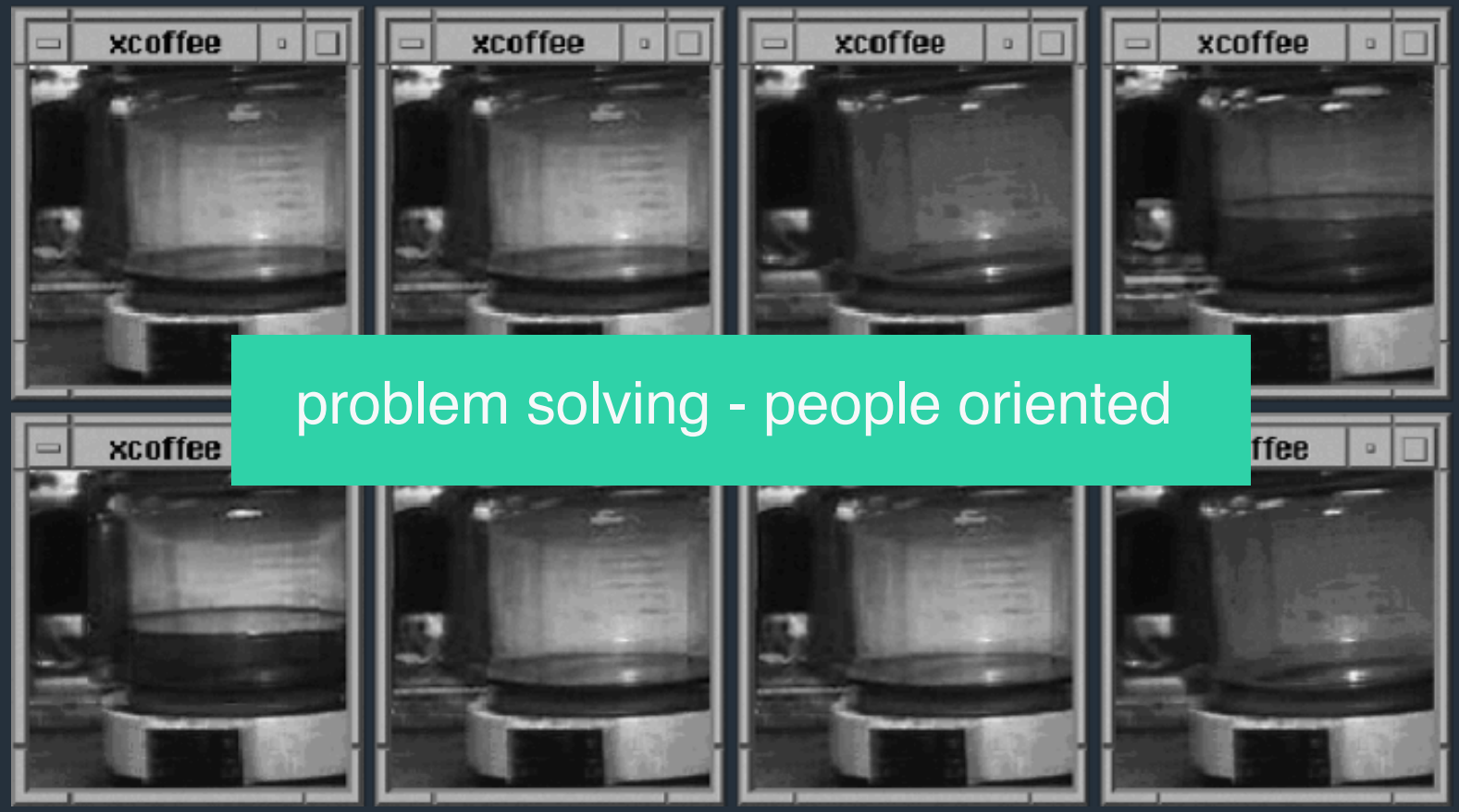
1991 - first IoT device



problem solving - people oriented

The Trojan Room Coffee Camera
Quentin Stafford-Fraser, Paul Jardetzki - Cambridge

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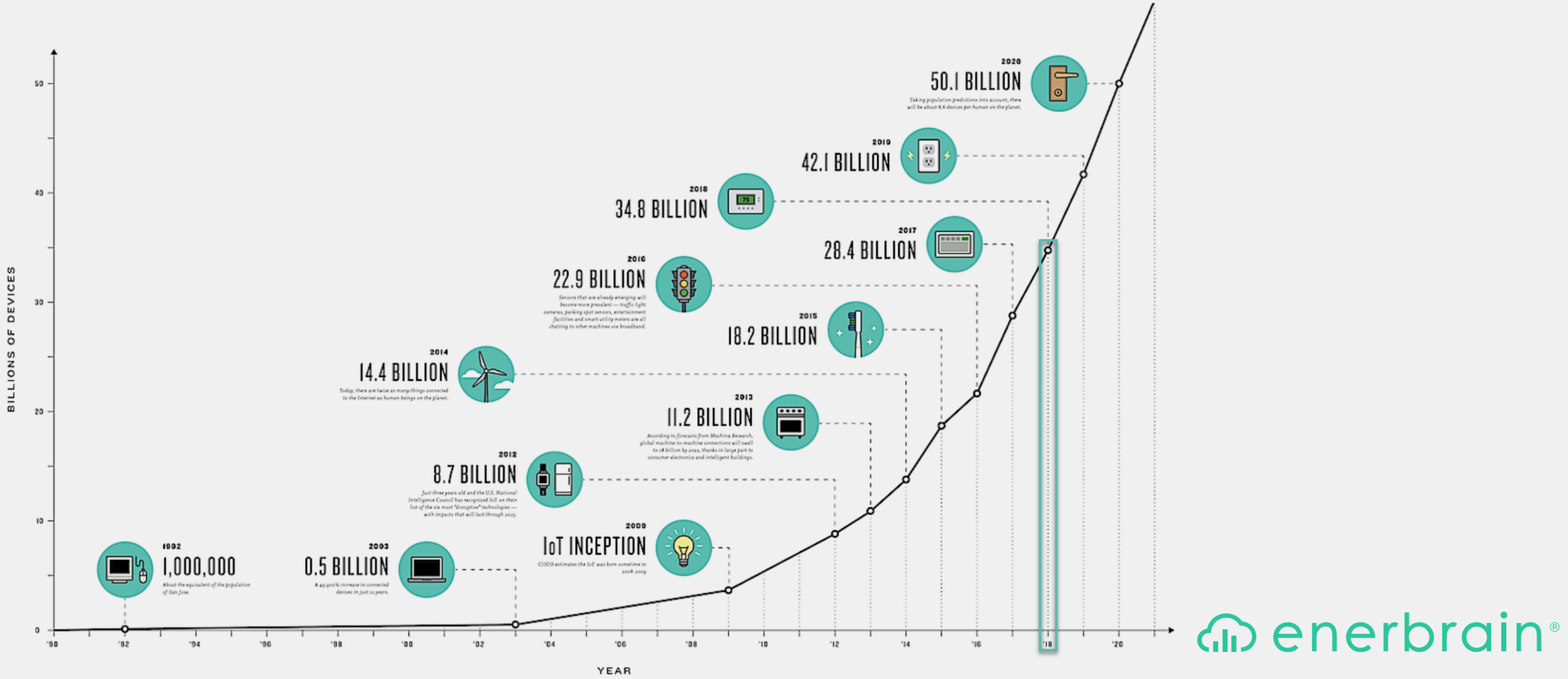
Current status of IoT



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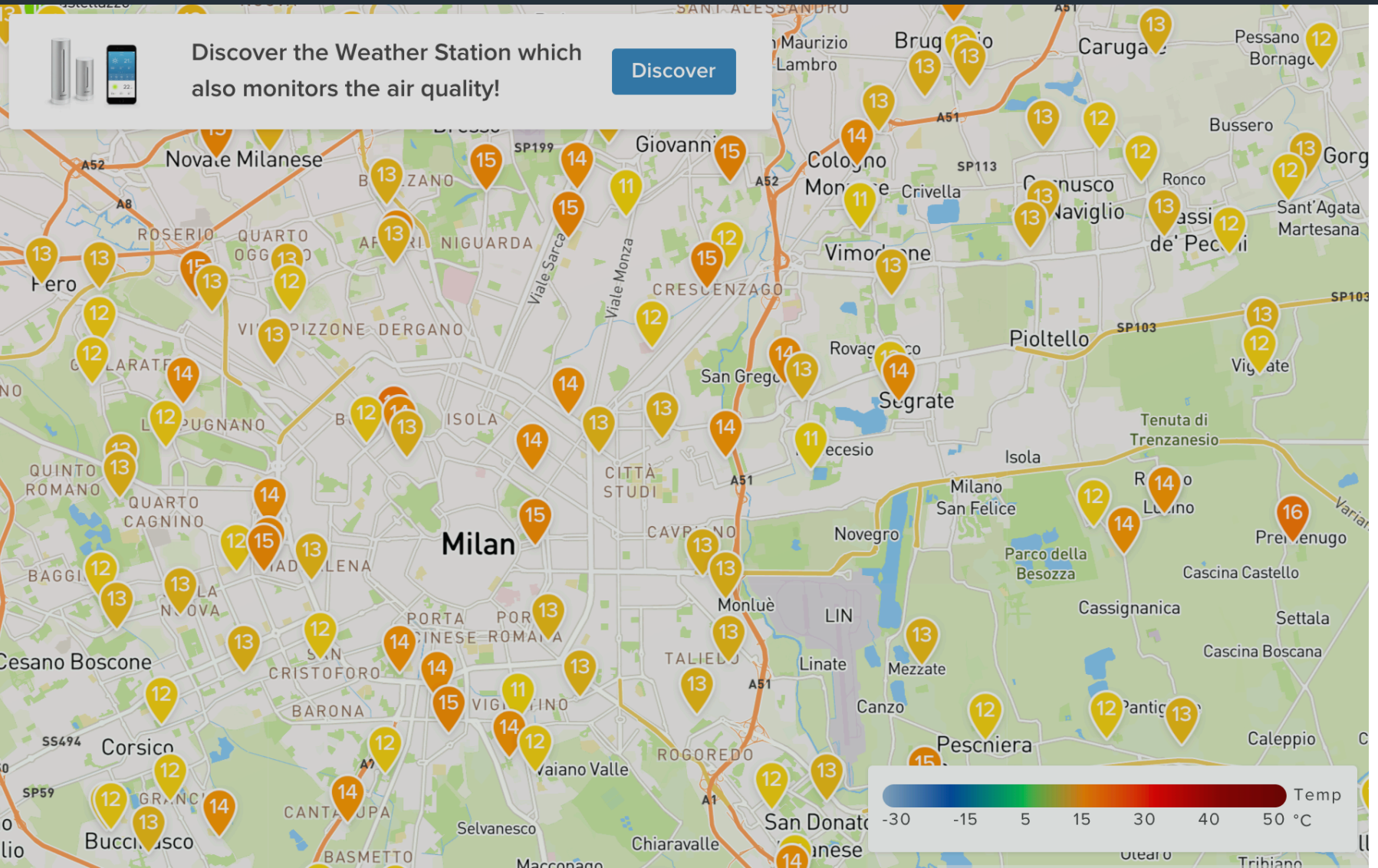
An example of distributed sensitivity



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An example of distributed sensitivity

Towards sensible & smart cities

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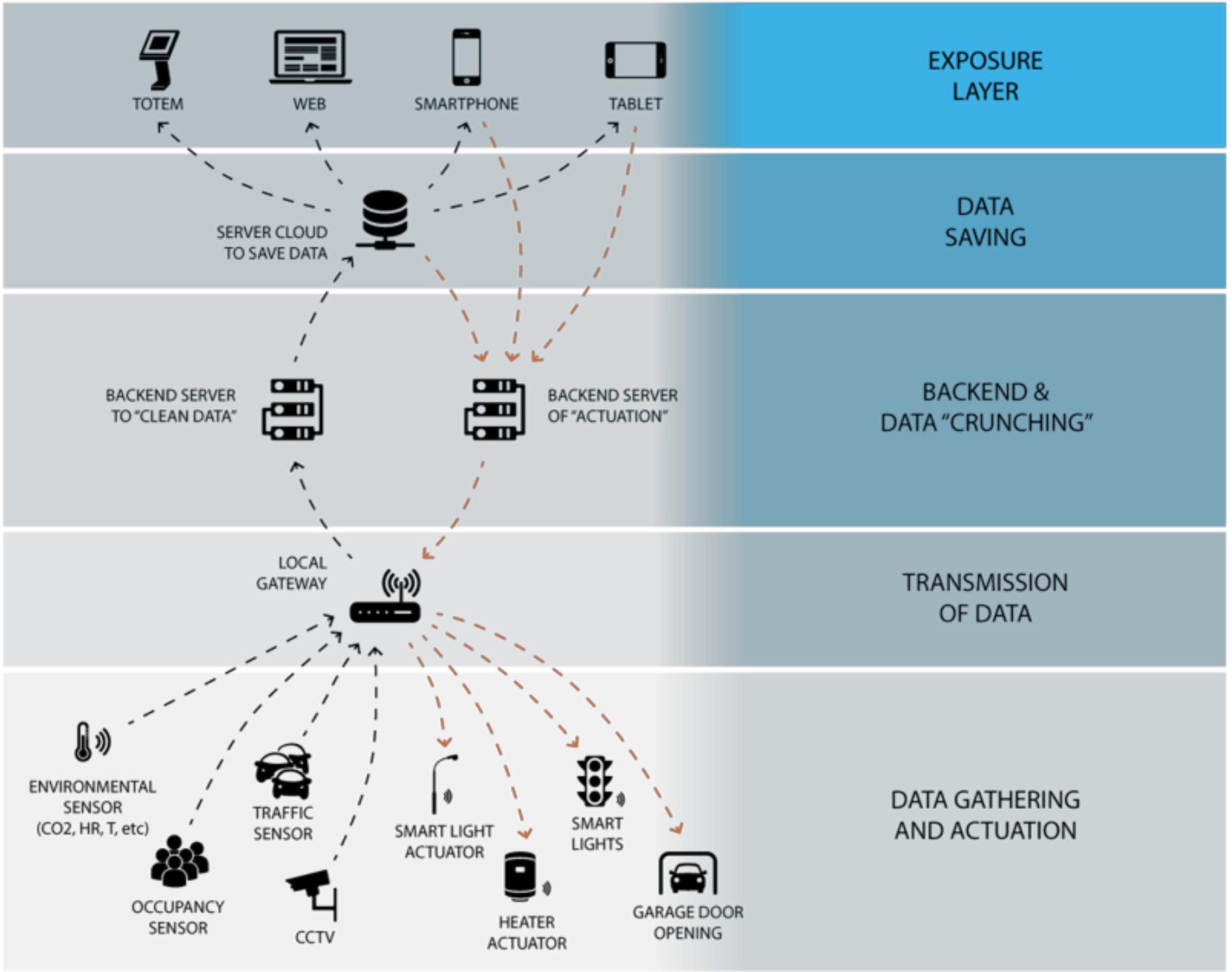

IoT

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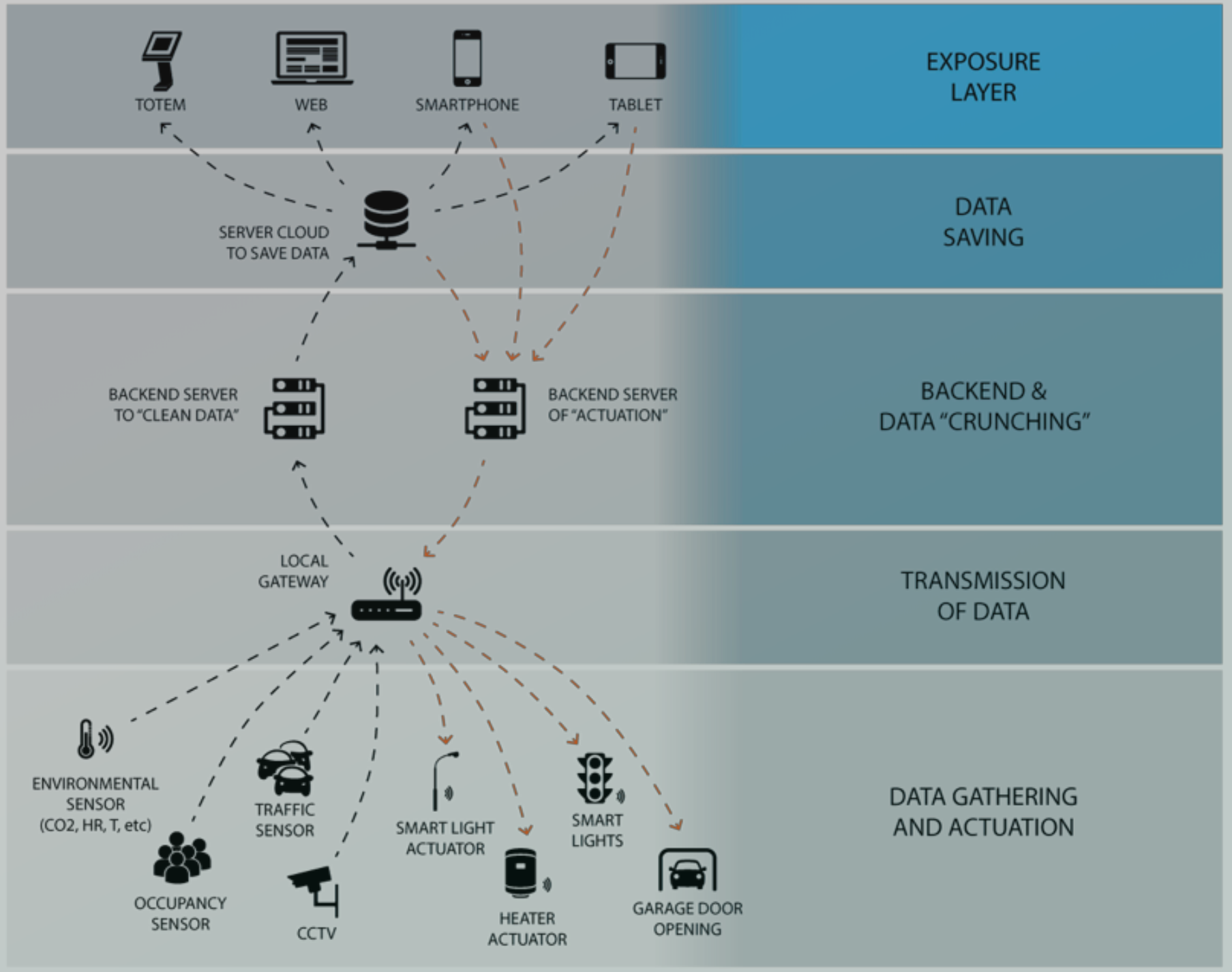

IoT

=

Infrastructure

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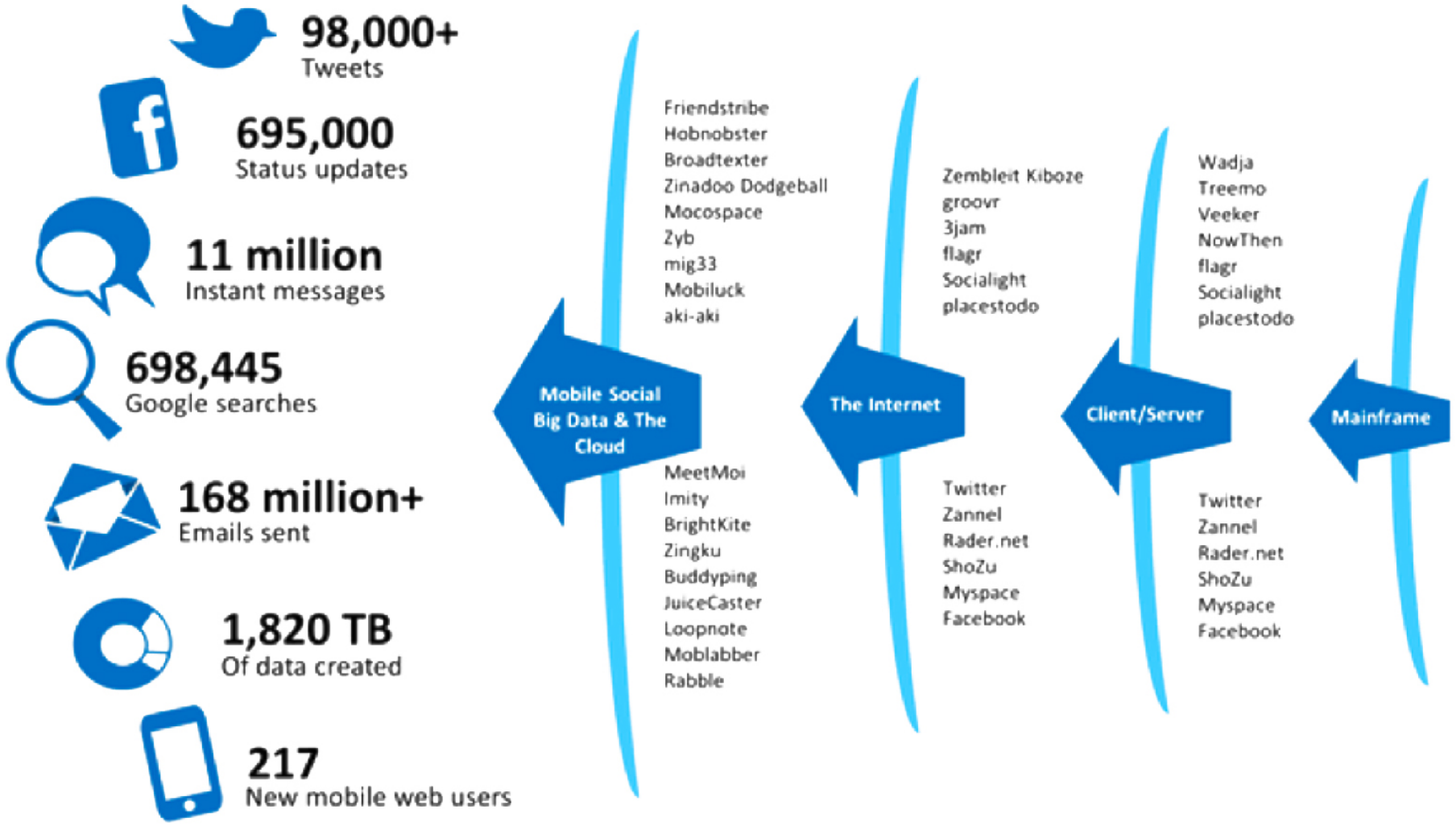
Every minute …



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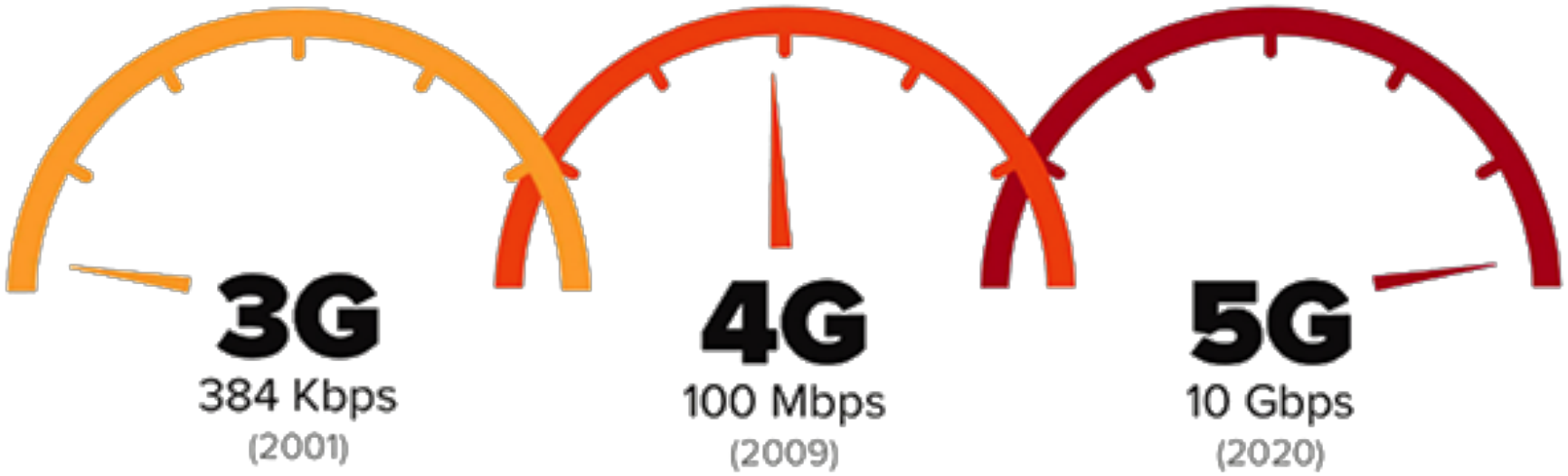
The present and future of IoT



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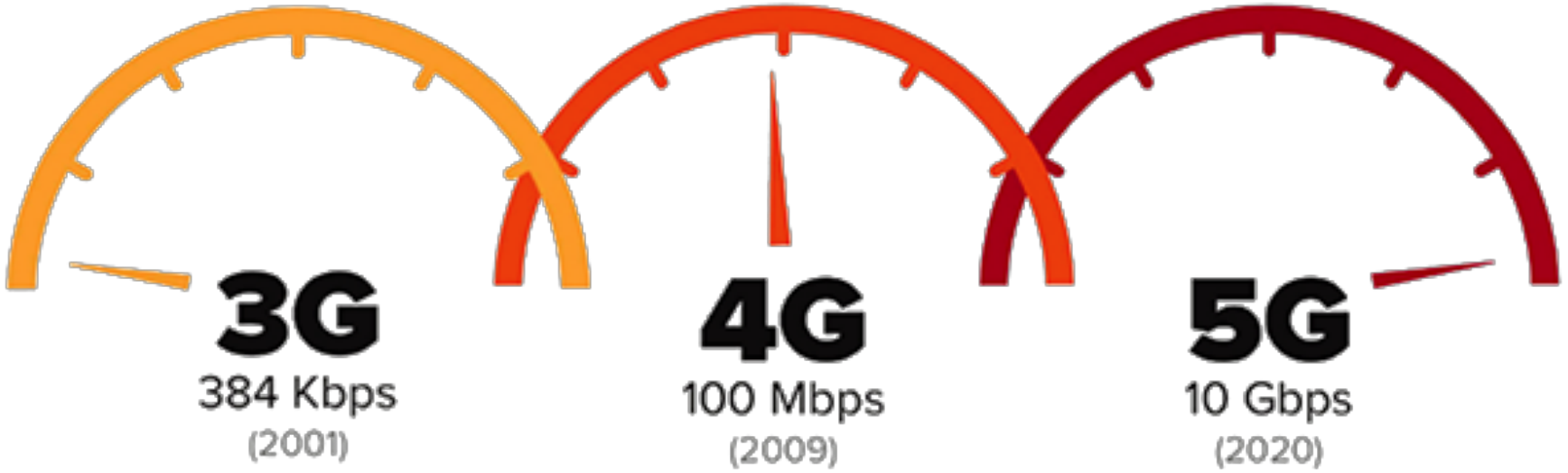
The present and future of IoT



+ RFID, Bluetooth LE, ZigBee, Thread, Zwave, EnOcean …

+ LTE-M, NB-IoT, Sigfox, LoRa, Telensa, PTC …

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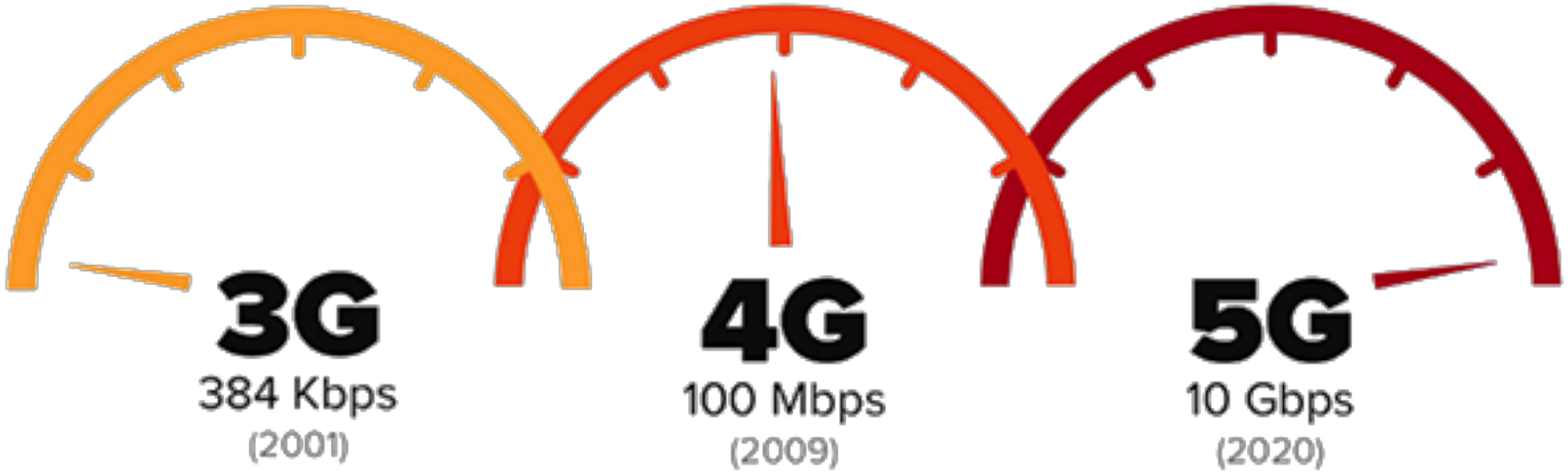
The present and future of IoT



+ RFID, Bluetooth LE, ZigBee, Thread, Zwave, EnOcean …

+ LTE-M, NB-IoT, Sigfox, LoRa, Telensa, PTC …

Need of open standards, high energy demand (devices + infrastructure), waste disposal and obsolescence, storage of data, privacy of data, security…

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IoT for a sustainable future
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40% of the world’s energy is consumed by buildings

160Bln Eu in heating and cooling costs per year
(8 Eu/sqm year avg)

US Green Building Council

Resulting in pollution and global warming

But buildings can “learn”

thanks to IoT

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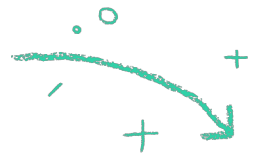
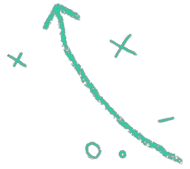
Closing the loop



sense think



act

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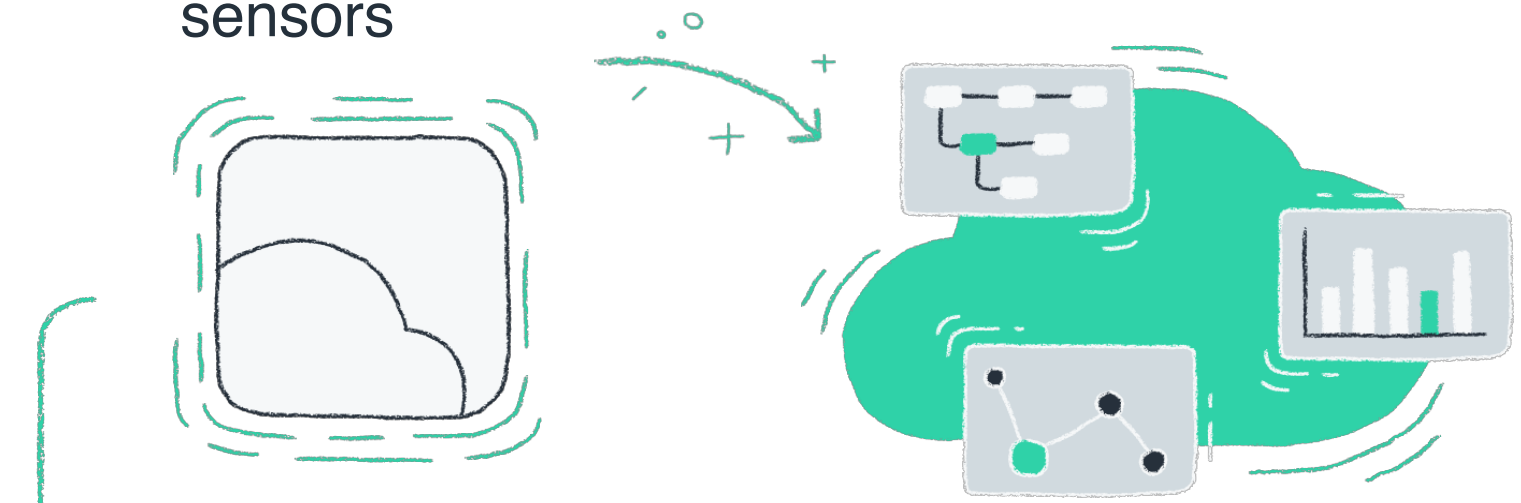
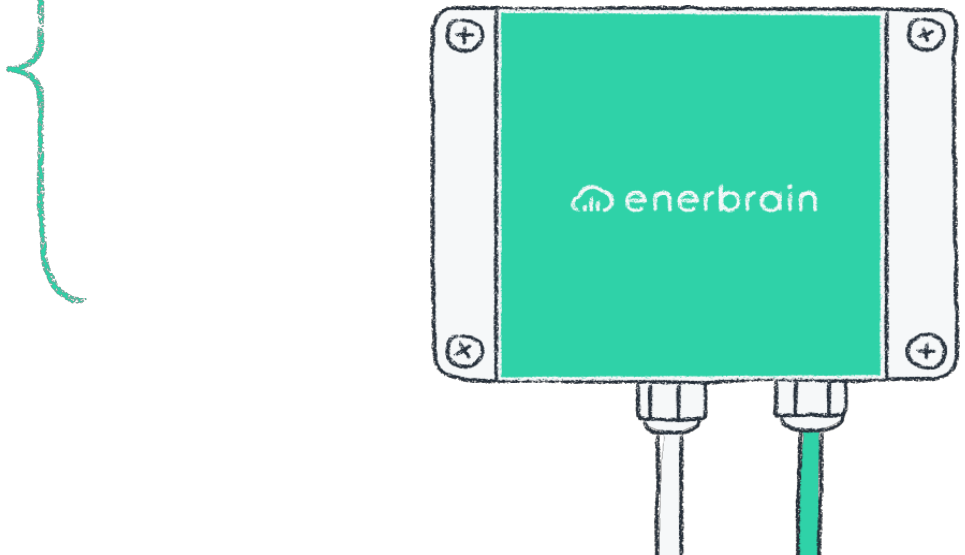
Closing the loop

Mobile & web app

Enviromental sensors

Self-learning algorithms





HVAC actuators

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How it works

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an example

Teatro Carignano, Turin (ITA)

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an example

Teatro Carignano, Turin (ITA)

23% energy reduction

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an example

IREN + Enerbrain for the city of Turin

Rollout on 89 buildings* in 4 weeks

24h/24 / remote control with algorithms
6.700 MWh / energy saved per year
1.400 t / CO_2 avoided emissions per year
100.000 ca / equivalent trees
7.000 ca / equivalent cars

* schools, theatres, offices & museums.


What is coming next?
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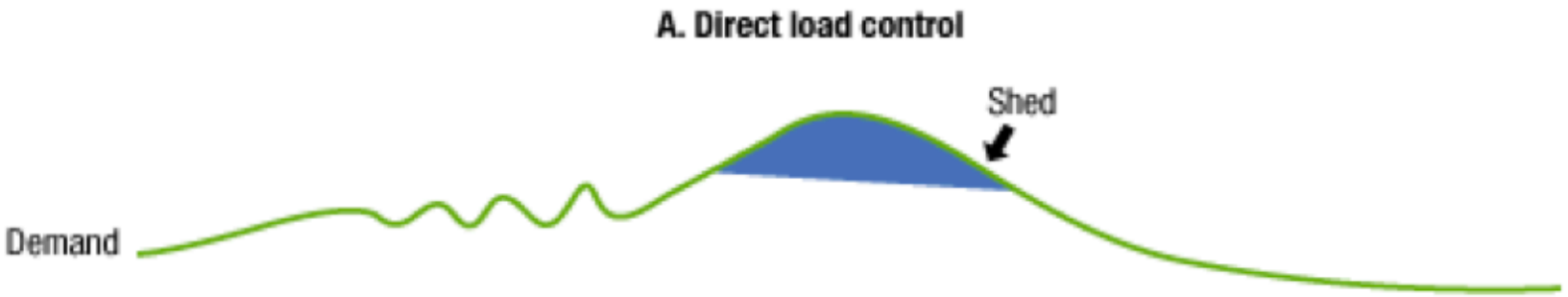
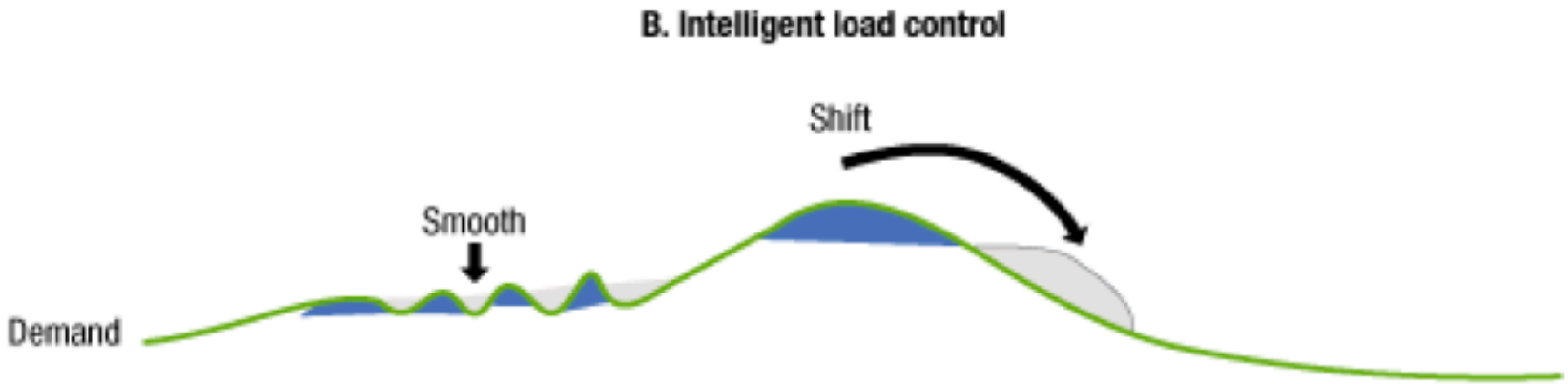
Full scale implementation of demand / response dynamics



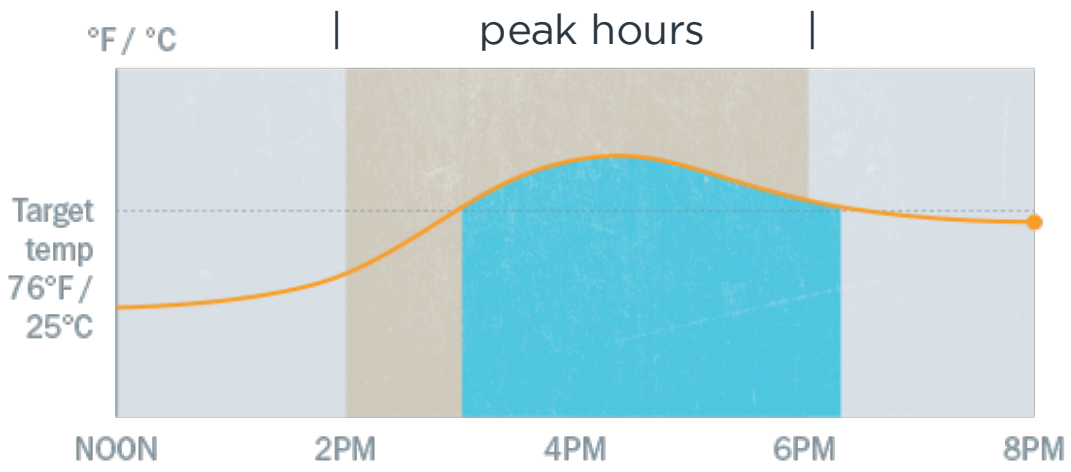
Peak shaving



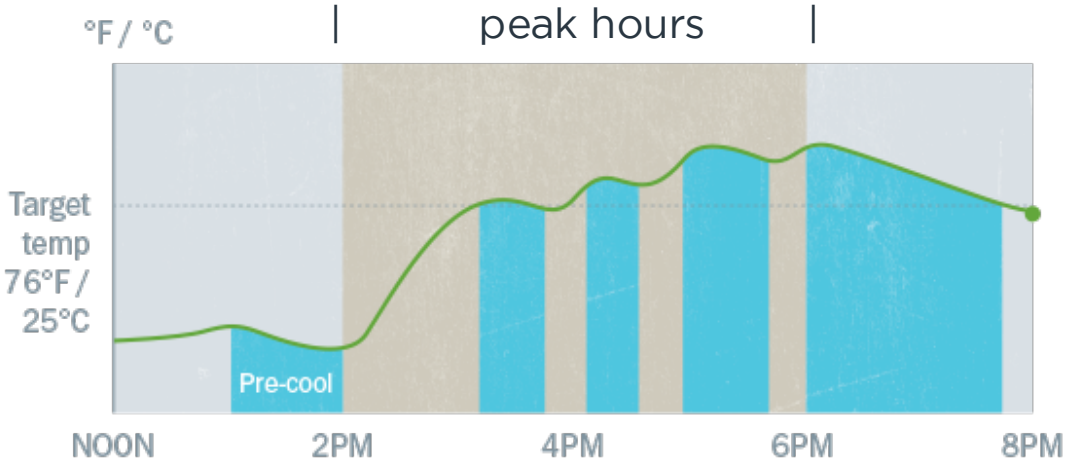
Peak shifting

full scale implementation of pre-heating and pre-cooling

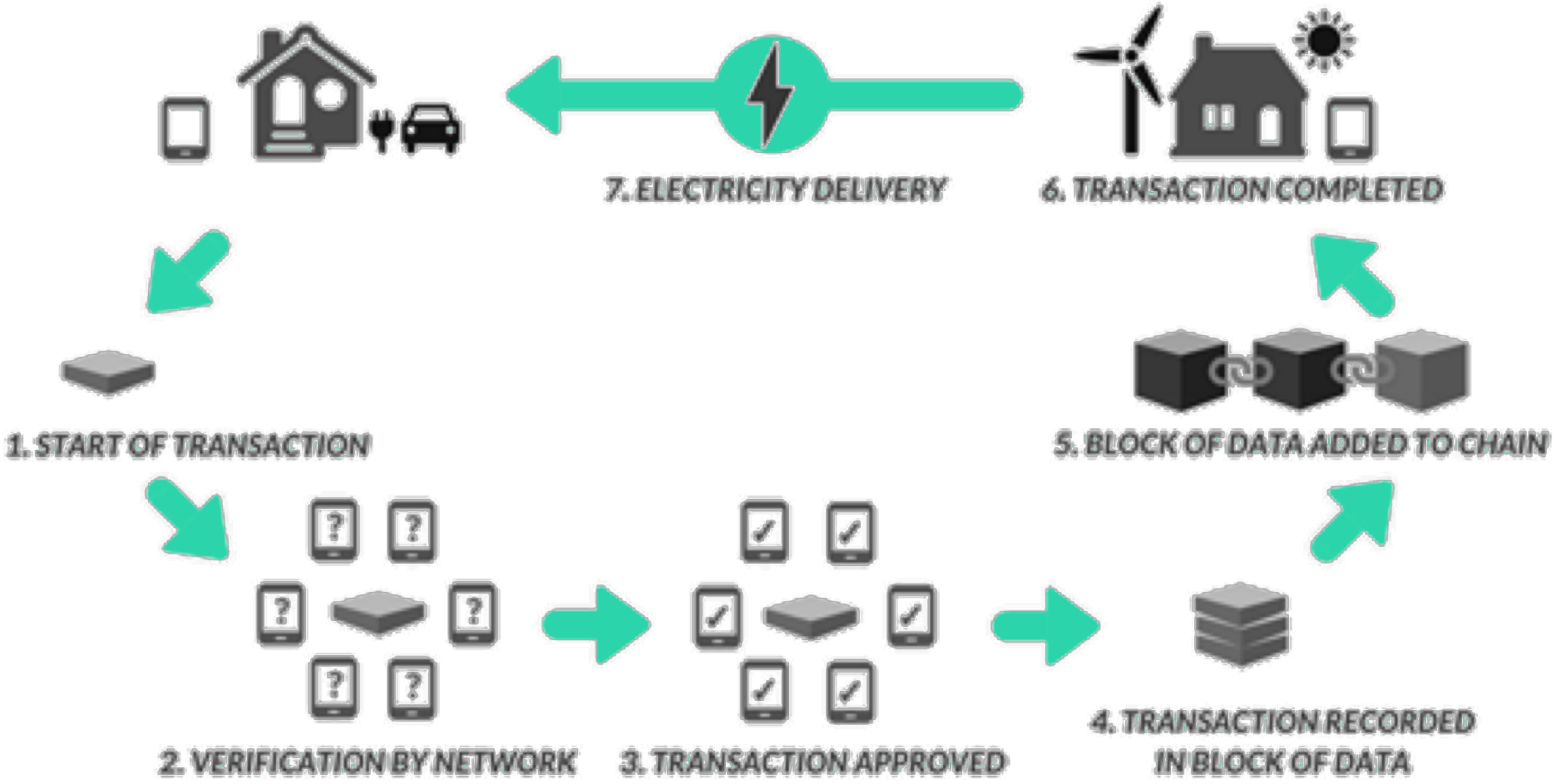
Typical cooling cycle, independent from energy cost



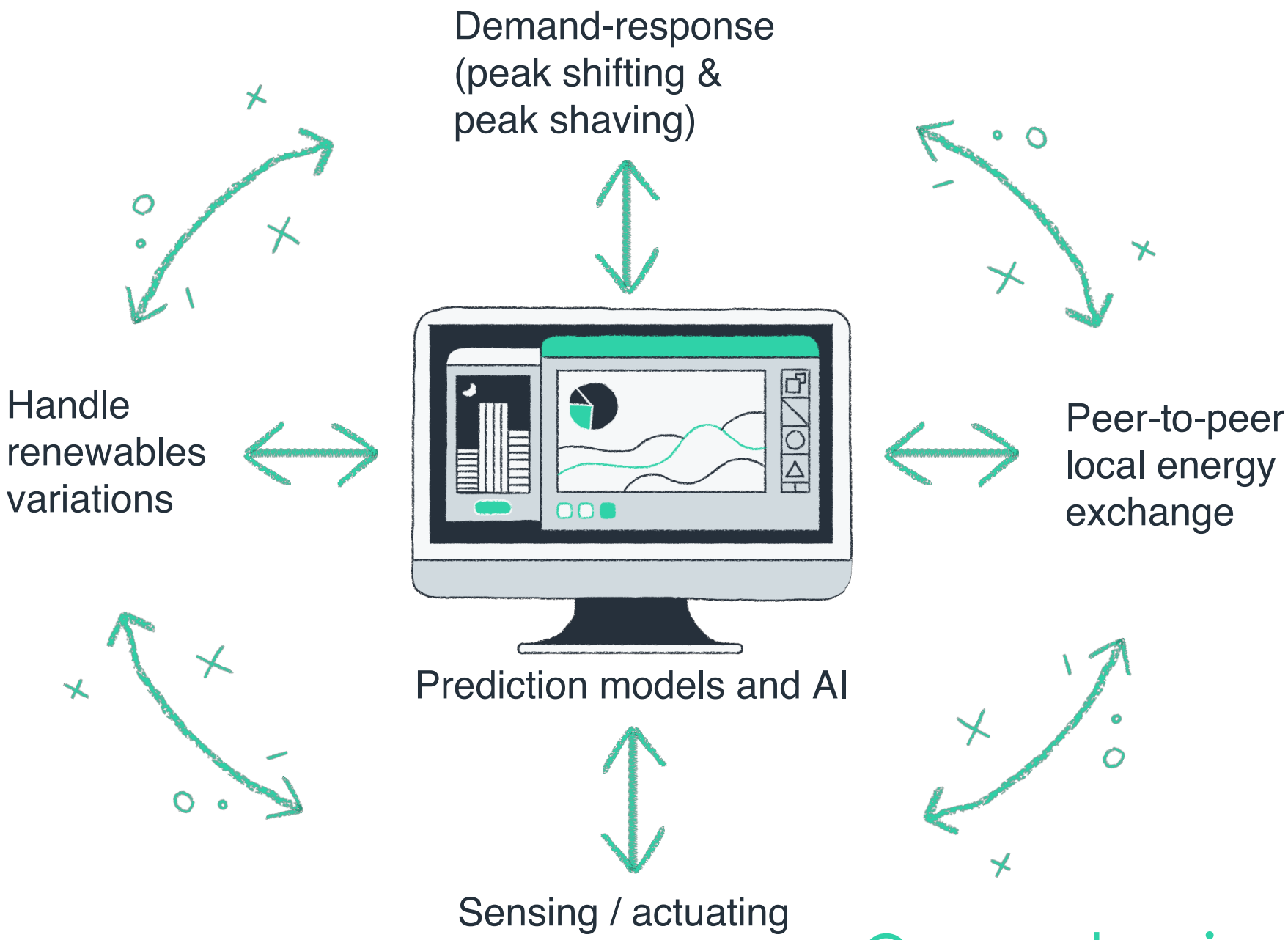
Smart cooling cycle, energy usage before and after peak hours



Peer to peer blockchain micro-energy transactions



Prediction model



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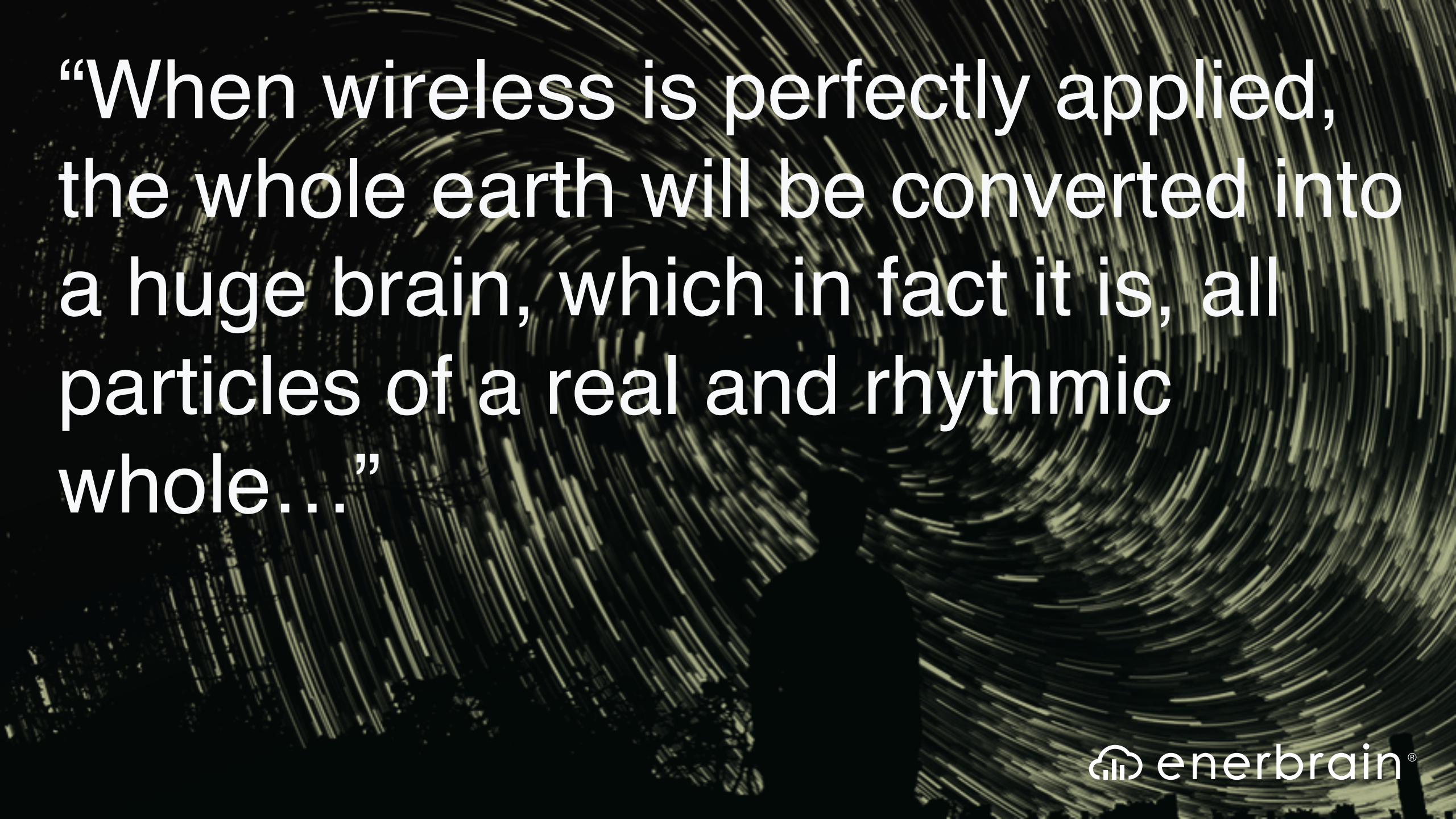
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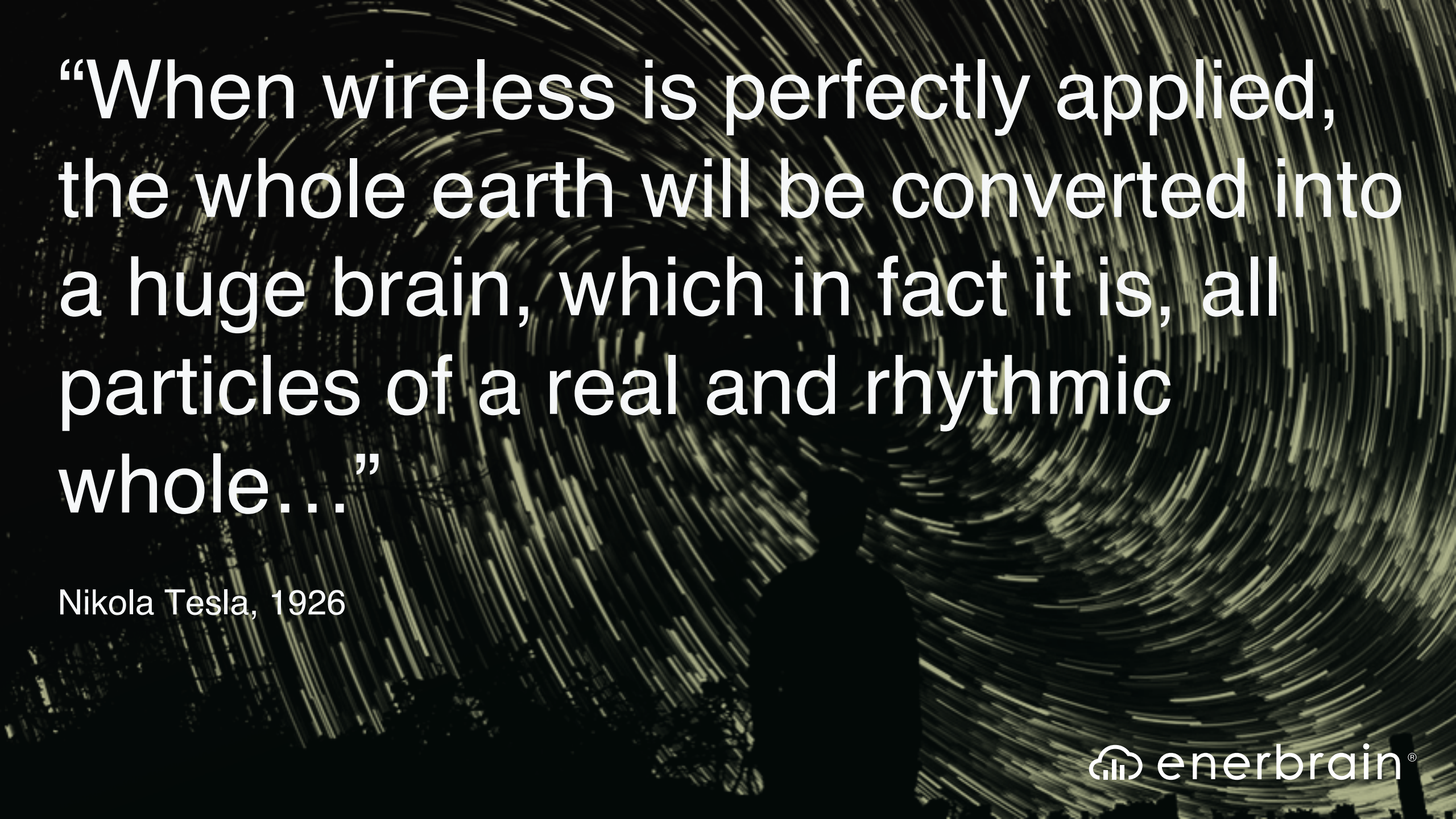
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Nikola Tesla, 1926
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