

# Open Geospatial Standards for Smart Cities - an Internet of Things Perspective



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# Why do we need to care?





# 14.4 Trillion

net profit

# 50 Billion

connected devices by 2020

# Everything has a location



- **Location information needs to be carefully described.**
- **e.g., outdoor, indoor, geometry, topology, semantics, etc.**



# Cheaper, Better and Faster



Kinetis KL02 MCU



Dark Data



Dark Assets





**Think about some Thing**



# Your Home



# Your Lock

TEO





# Your Shirt



A group of people are running on treadmills in a gym. Overlaid on the image are two data panels showing running metrics for two individuals. The first panel, for a man in the foreground, shows a pace of 4:48 min/km, a heart rate of 164 bpm, and 6815 steps. The second panel, for a man in the background, shows a pace of 4:41 min/km, a heart rate of 158 bpm, and 7383 steps.

Metric	Man (Left)	Man (Right)
Pace	4:48 MIN/KM	4:41 MIN/KM
Heart Rate	164 BPM	158 BPM
Steps	6815	7383

**HEXOSKIN**  
WEARABLE BODY METRICS

# Your Drinks





# Your Lights



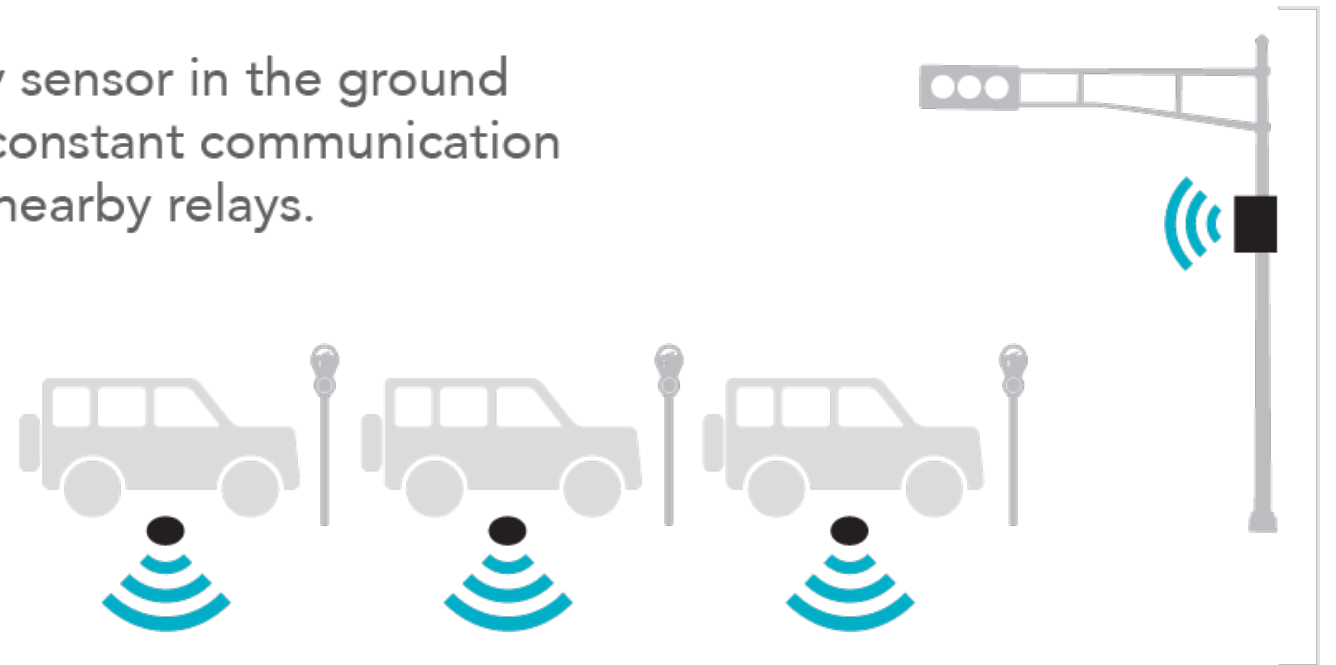
Enlighted and Phillips Hue

# Your Parking



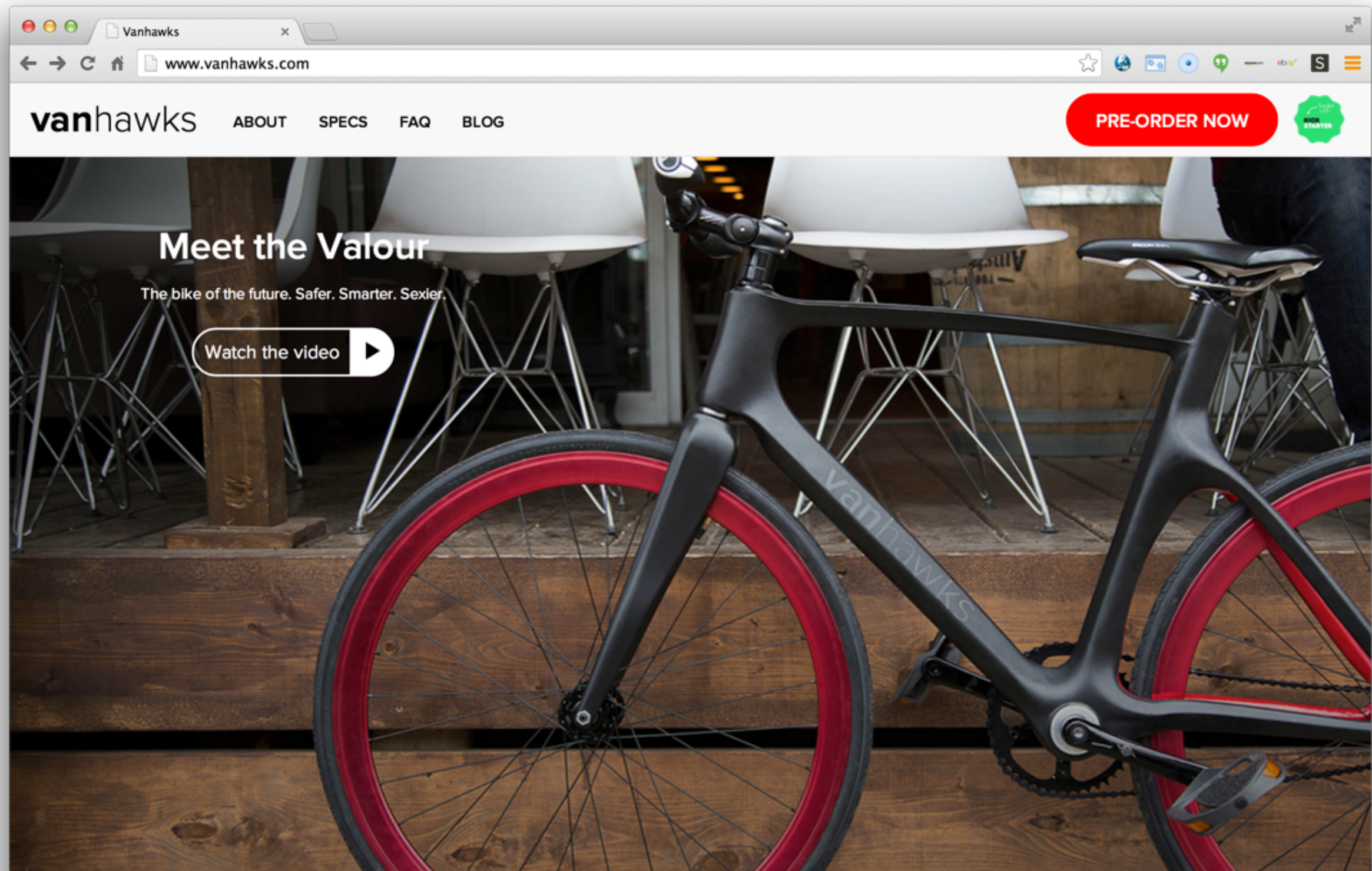
4 INCHES

Every sensor in the ground is in constant communication with nearby relays.





# Your Bike





# Your Air and Noise





# Your Babies



# Your Cat Litter



tailio





# Your Feet

Self-monitoring Device for x


orpyx.com/pages/surrosense-rx

ORPYX  
HUMAN PERCEPTION REDEFINED

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Home / SurroSense Rx System

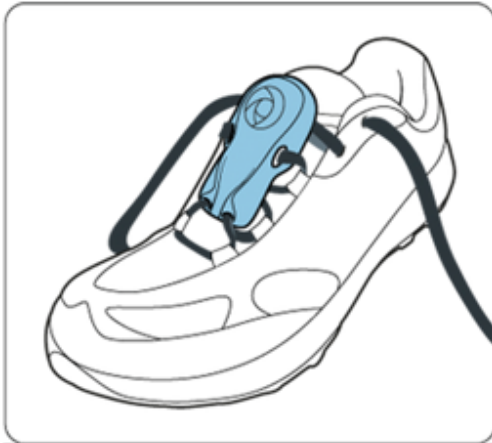


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Neuropathy can cause a loss of feeling in the feet. Stay connected to your feet to help prevent ulceration with the SurroSense Rx™ System

- Pressure data is collected from the foot through a sensor-embedded insert worn in the shoe
- The system wirelessly sends information to a smartwatch or smartphone app that provides feedback from the feet
- When dangerous pressure levels have been detected the smartwatch alerts the user, so that behaviour can be changed and damage avoided
- Track progress with a personalized **Orpyx Connect Account**. Use online charts to gain insight on what's happening underfoot

Diabetes Can Knock You Off Your Feet

# Your Health



Smarter management  
for asthma and COPD.

FIND OUT HOW

<http://propellerhealth.com/>



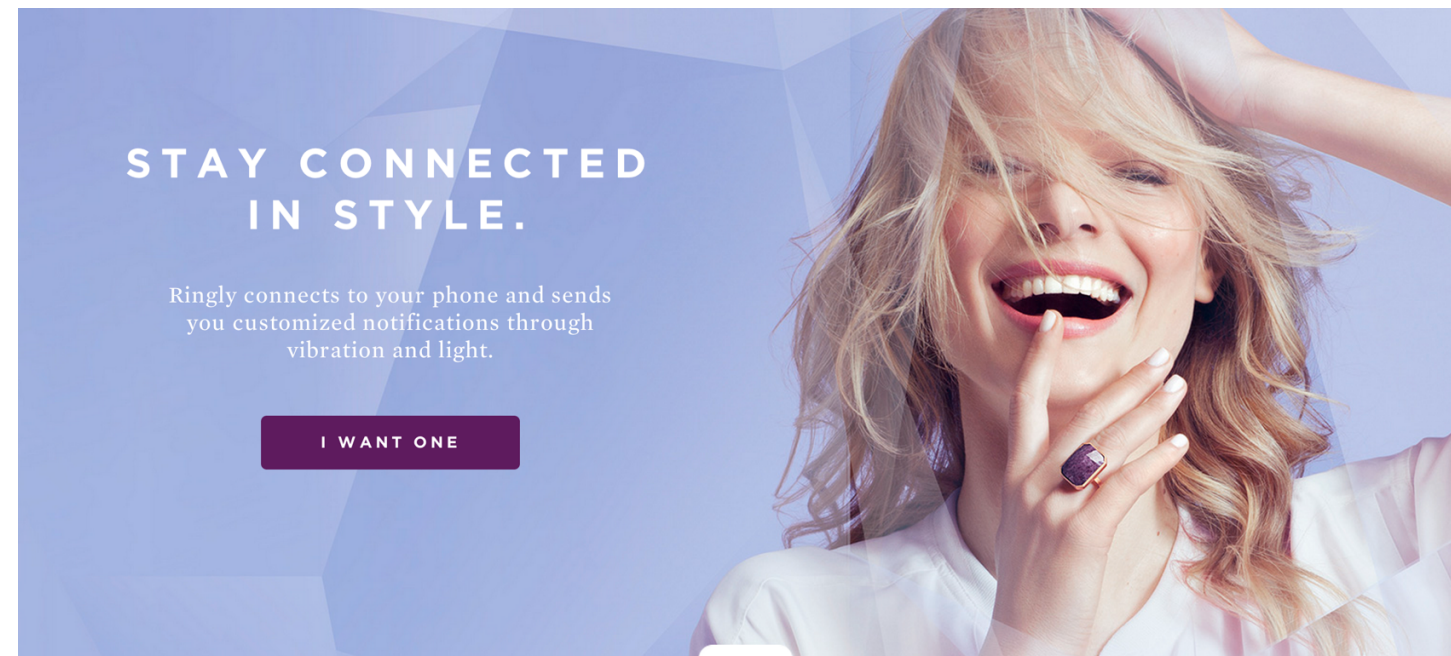
# Even Your Jewelry



JUNE  
by netatmo

Be sun savvy

[▶ Play Video](#)



**STAY CONNECTED  
IN STYLE.**

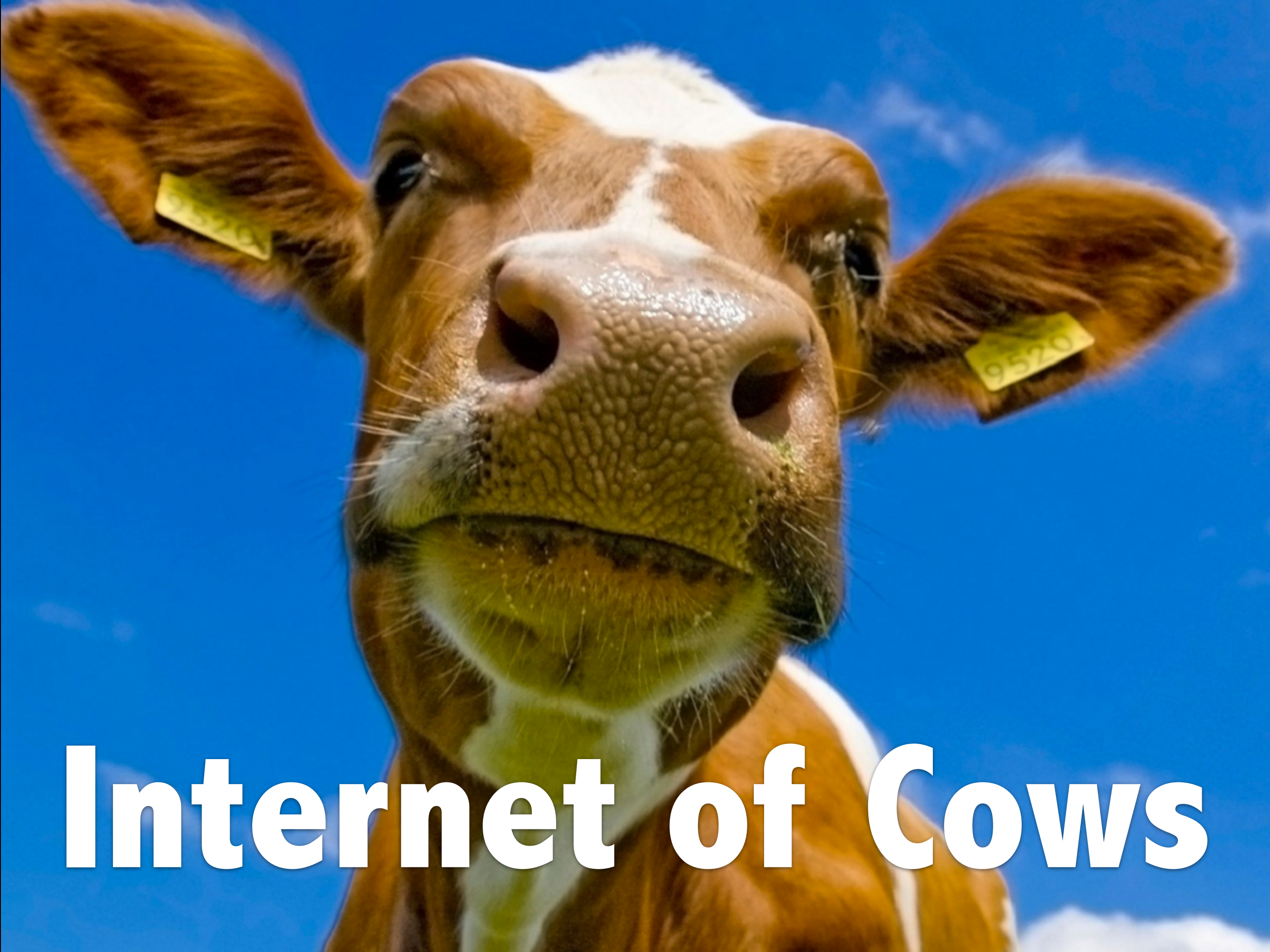
Ringly connects to your phone and sends  
you customized notifications through  
vibration and light.

[I WANT ONE](#)









# Internet of Cows

**Internet of Things is**  
irrelevant



# Case Study: Connected Jolly Jumper?



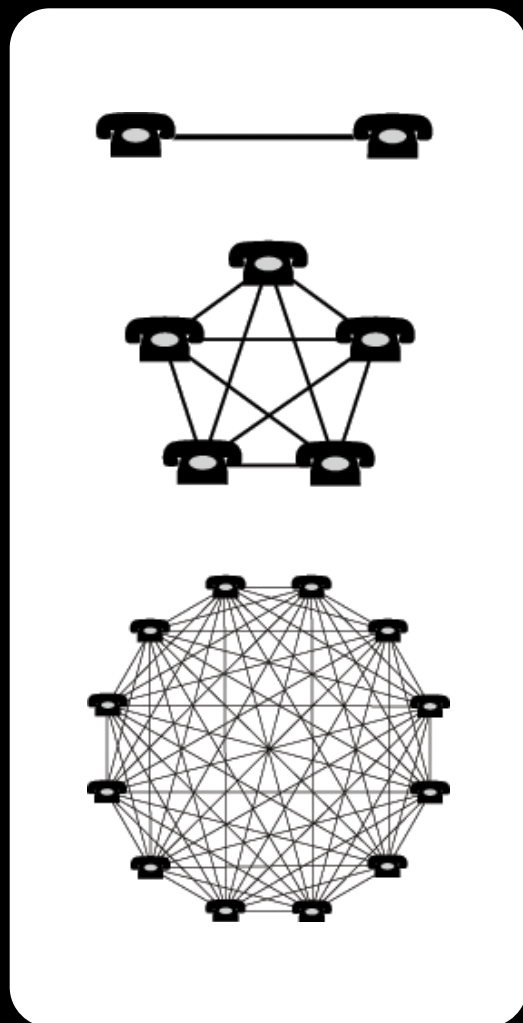
# What if a Baby Fall?



**From Selling Jolly Jumpers to  
Happy, Healthy, and Growing Babies**

and to attract developers to use its API to develop  
innovative applications.

# **Service Enablement**, the real potential of Internet of Things

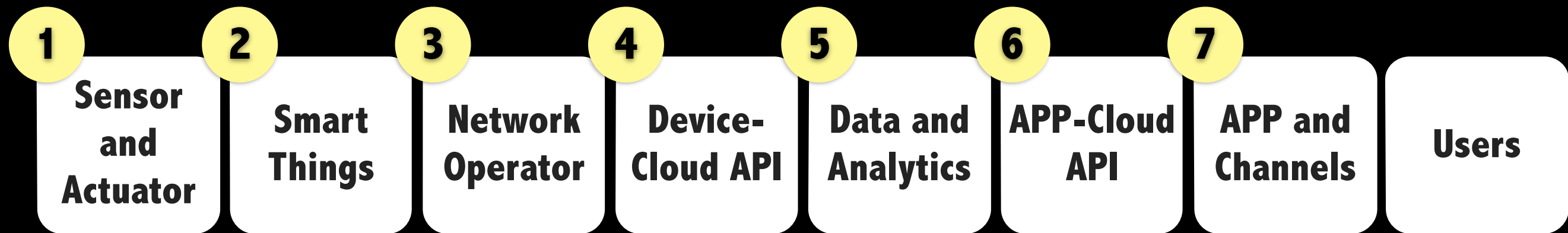


**Service Enablement** transform user experiences

**Network Effect:** The value of a network is proportional to the square of the number of users of the system ( $n^2$ ).



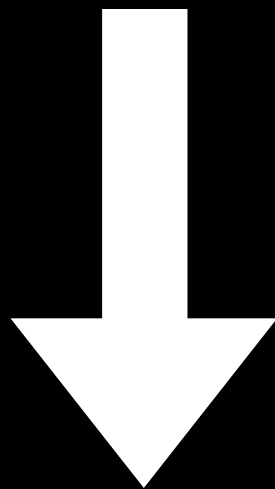
# IoT Value Chain



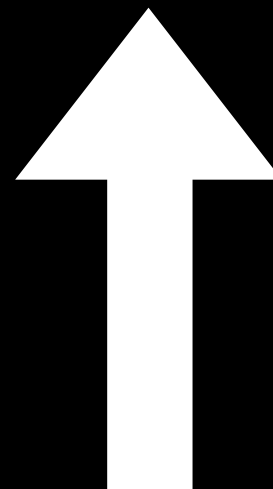
# How smart is your city?

How fast can you move in the  
IoT (sensing) value chain?

Friction

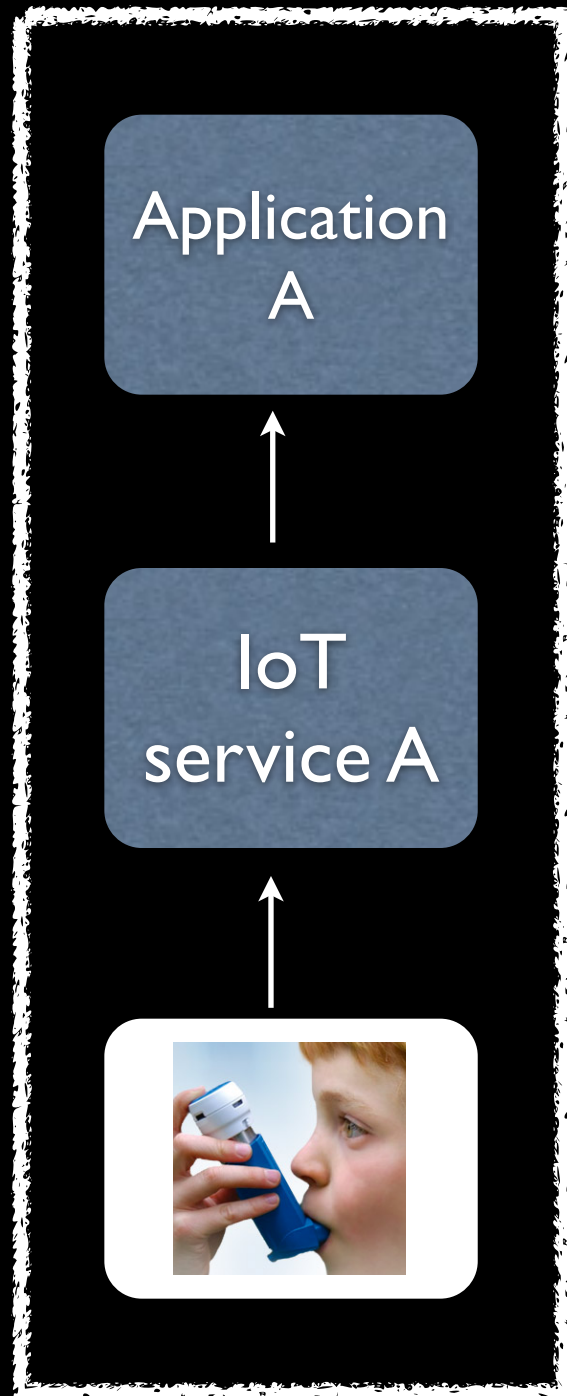


Motion

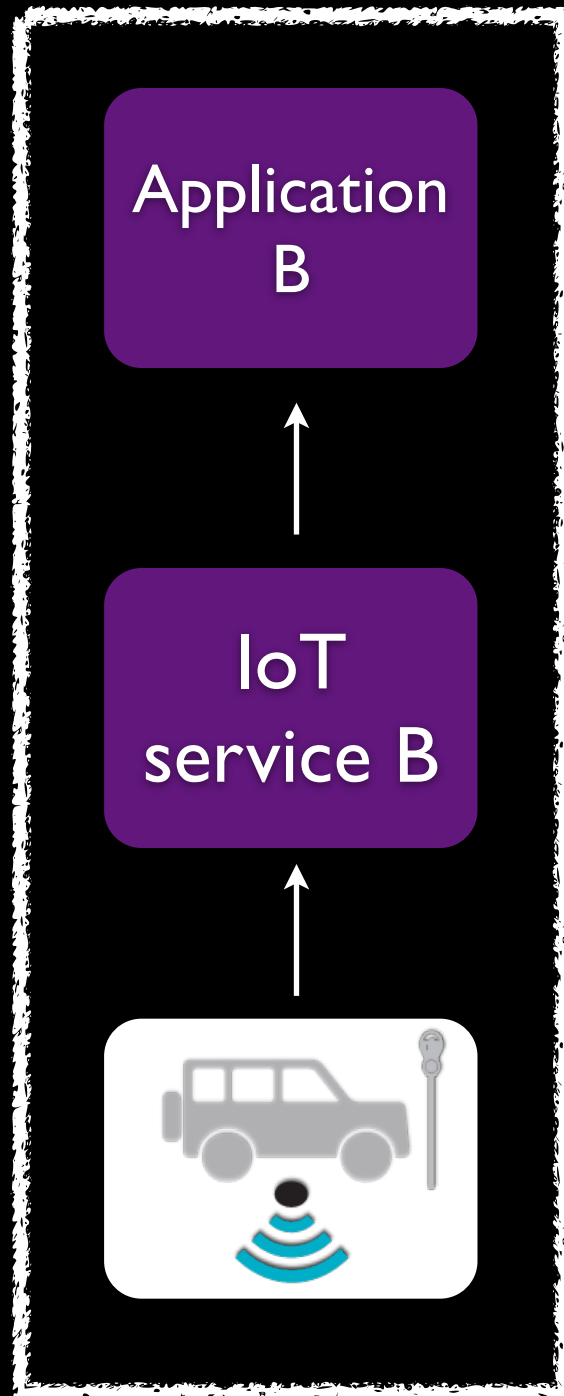


# Today's IoT ecosystem

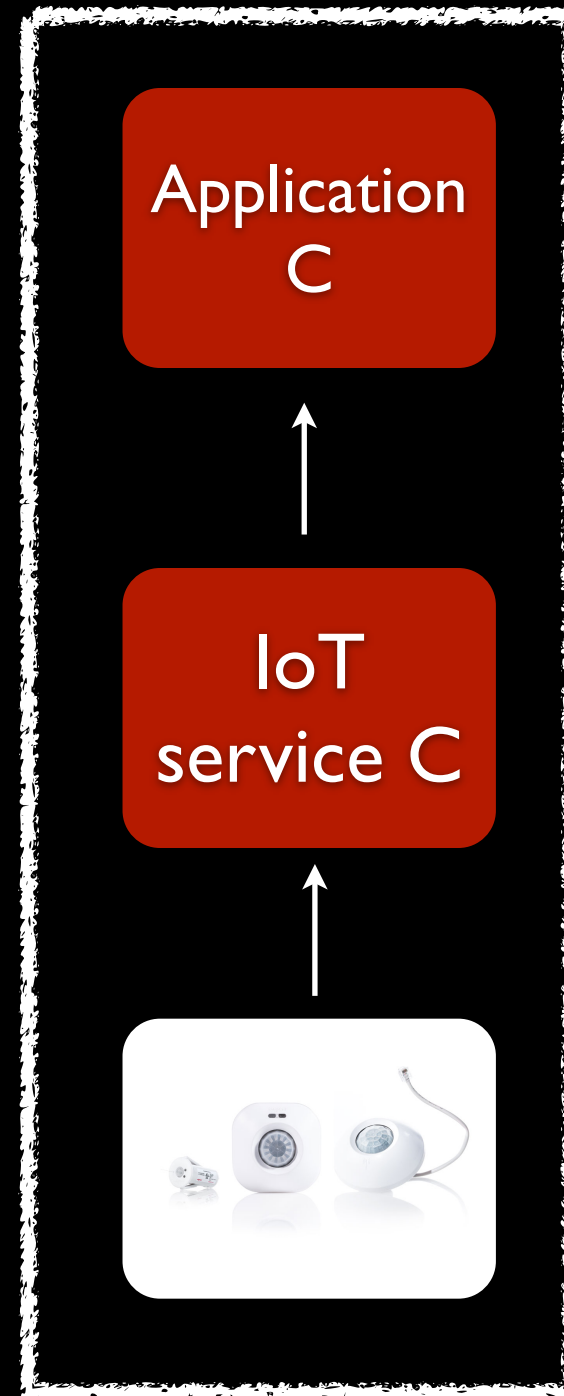
**Silo A**



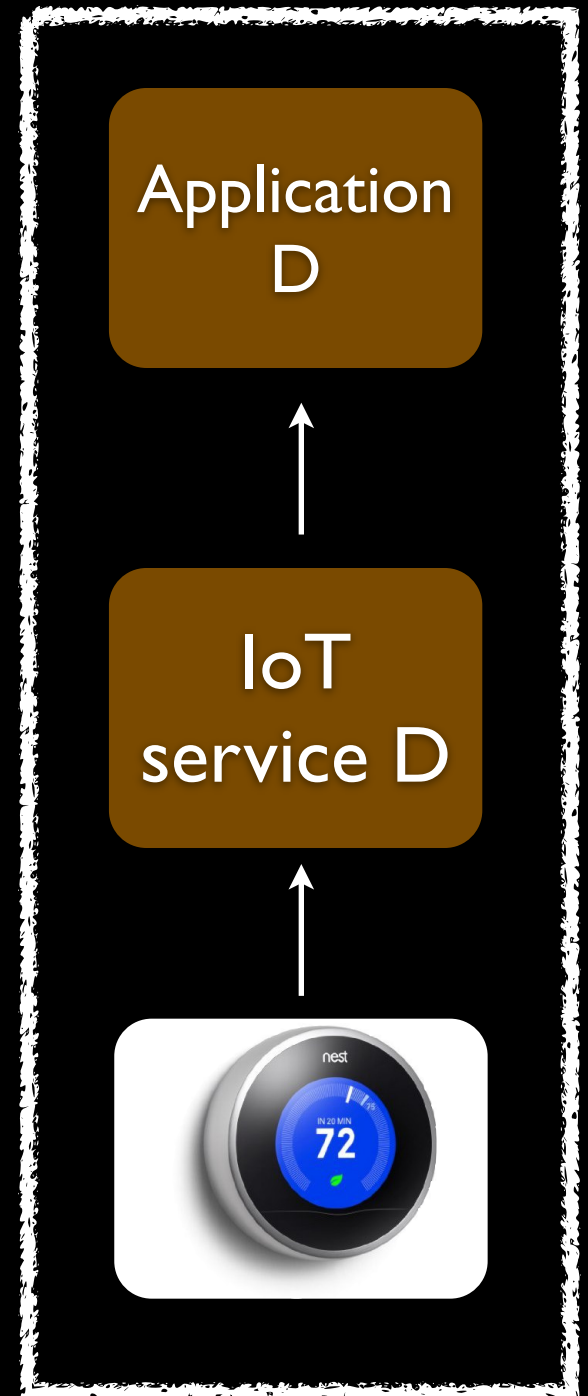
**Silo B**



**Silo C**



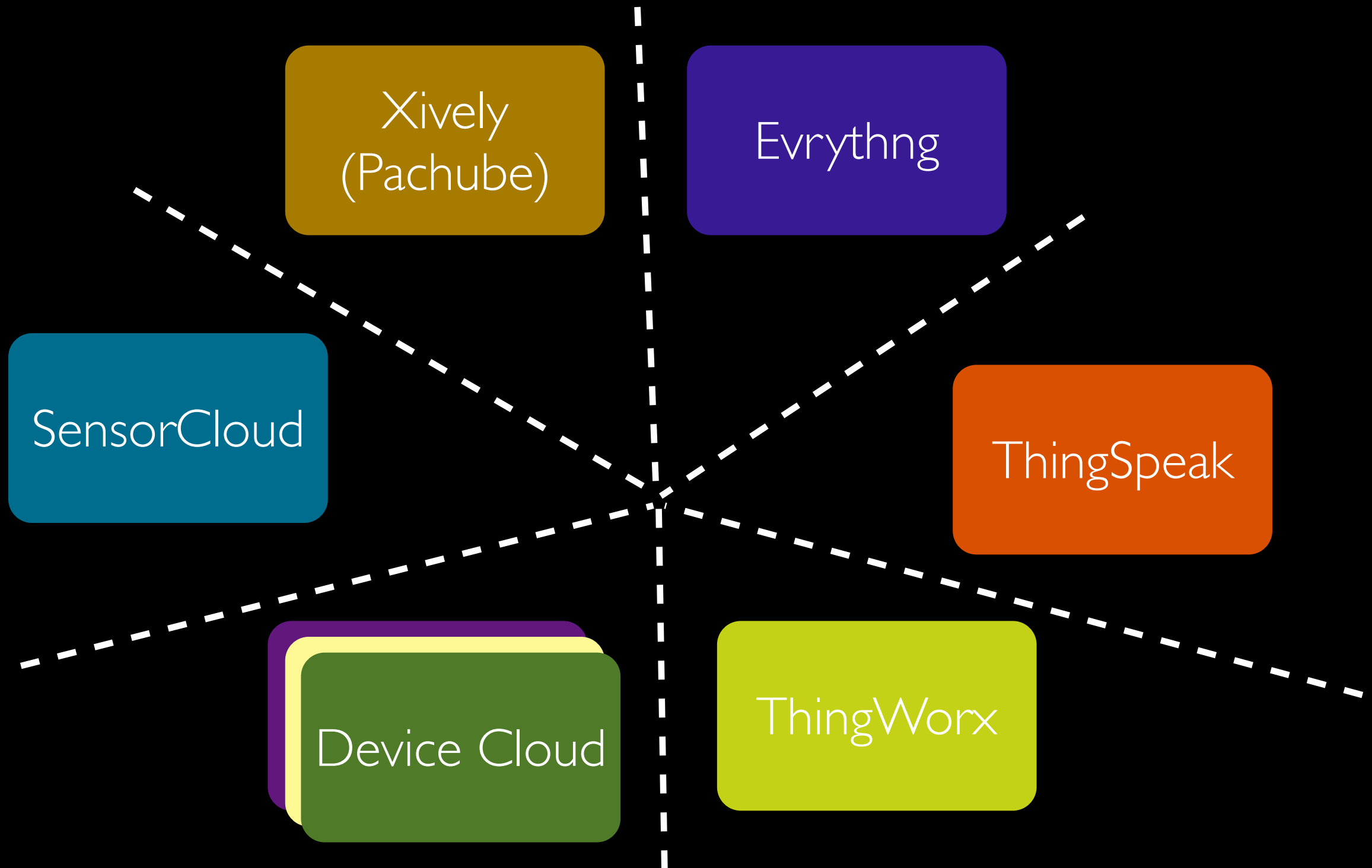
**Silo D**





# One Cloud for Everything? Really?

*i.e., high risks, short product lifecycle, vendor lock-in, etc.*



OGC SensorThings API

ogc-iot.github.io/ogc-iot-api/

OGC SensorThings API

Home

FAQ

Quickstart

Data Model

API Reference

Ecosystem

Community

# OGC SensorThings API

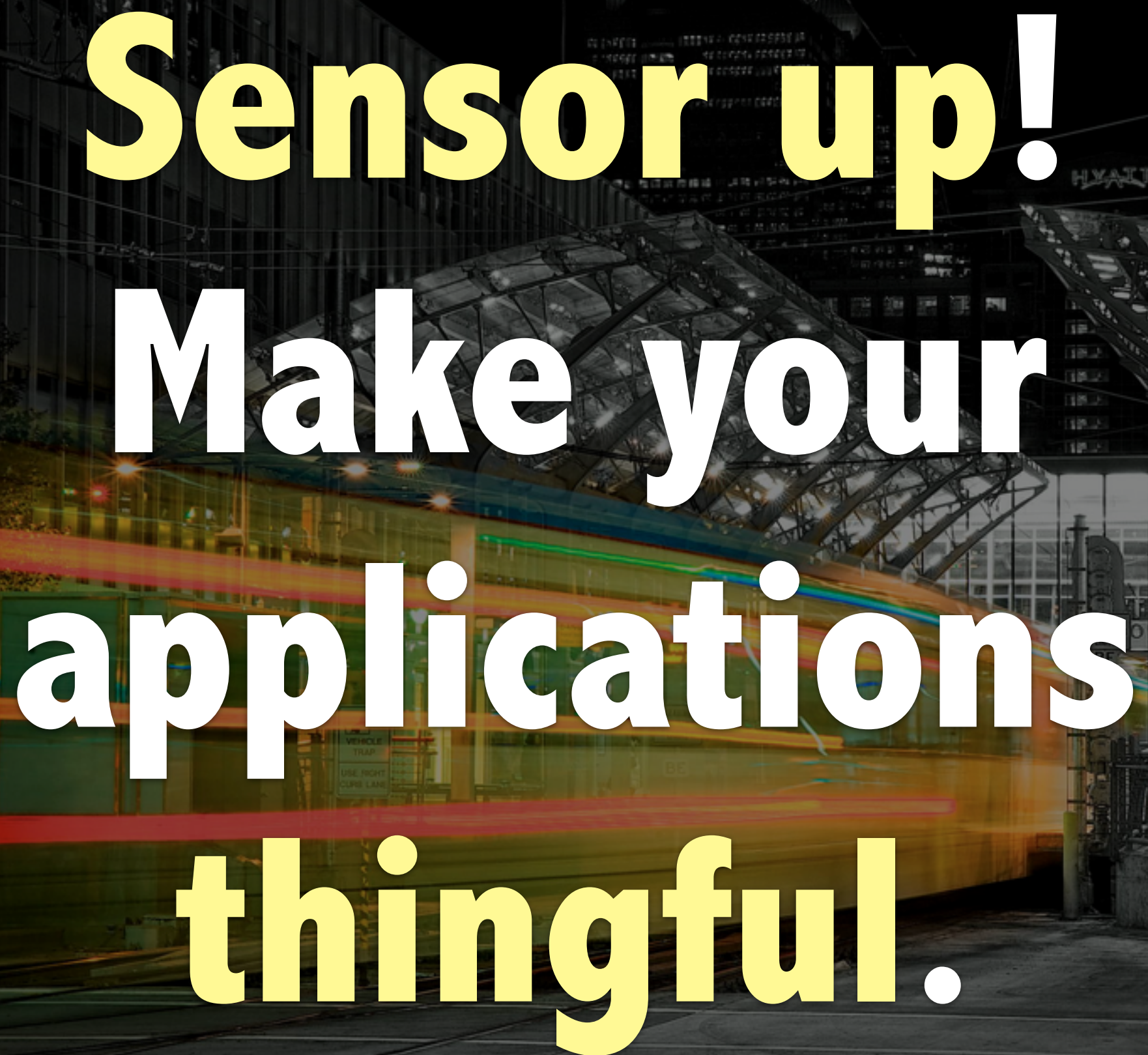
The OGC SensorThings API is an OGC candidate standard for providing an open and unified way to interconnect IoT devices, data, and applications over the Web. The SensorThings API is an open standard, builds on Web protocols and the **OGC Sensor Web Enablement standards**, and applies an easy-to-use REST-like style. The result is to provide a uniform way to expose the full potential of the Internet of Things.

Learn More

# Join the Open IoT Ecosystem

- Do not use vendor lock-in APIs
- Try SensorThings, criticize it, or better yet, improve it.
- Write an open source library
- Promote it in your community



A long-exposure photograph of a city street at night. A train is blurred horizontally across the middle of the frame, creating a rainbow-colored light trail. Other light trails from cars are visible in the foreground. In the background, there are city buildings, including one with a 'HYATT' sign. The overall scene is dark with vibrant light trails.

**Sensor up!**  
**Make your**  
**applications**  
**thingful.**