

Internet de las Cosas (IoT)

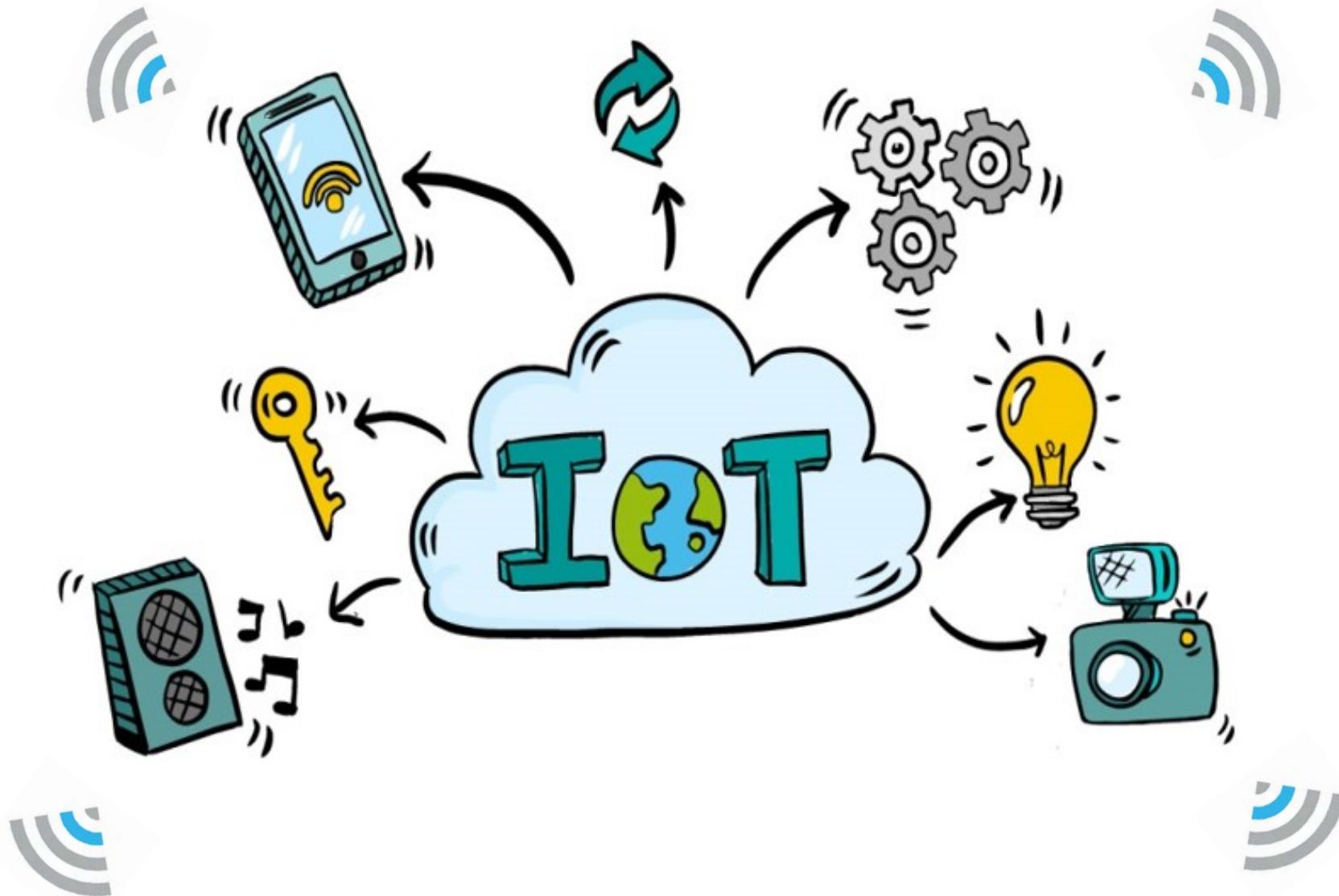
Marco Teran

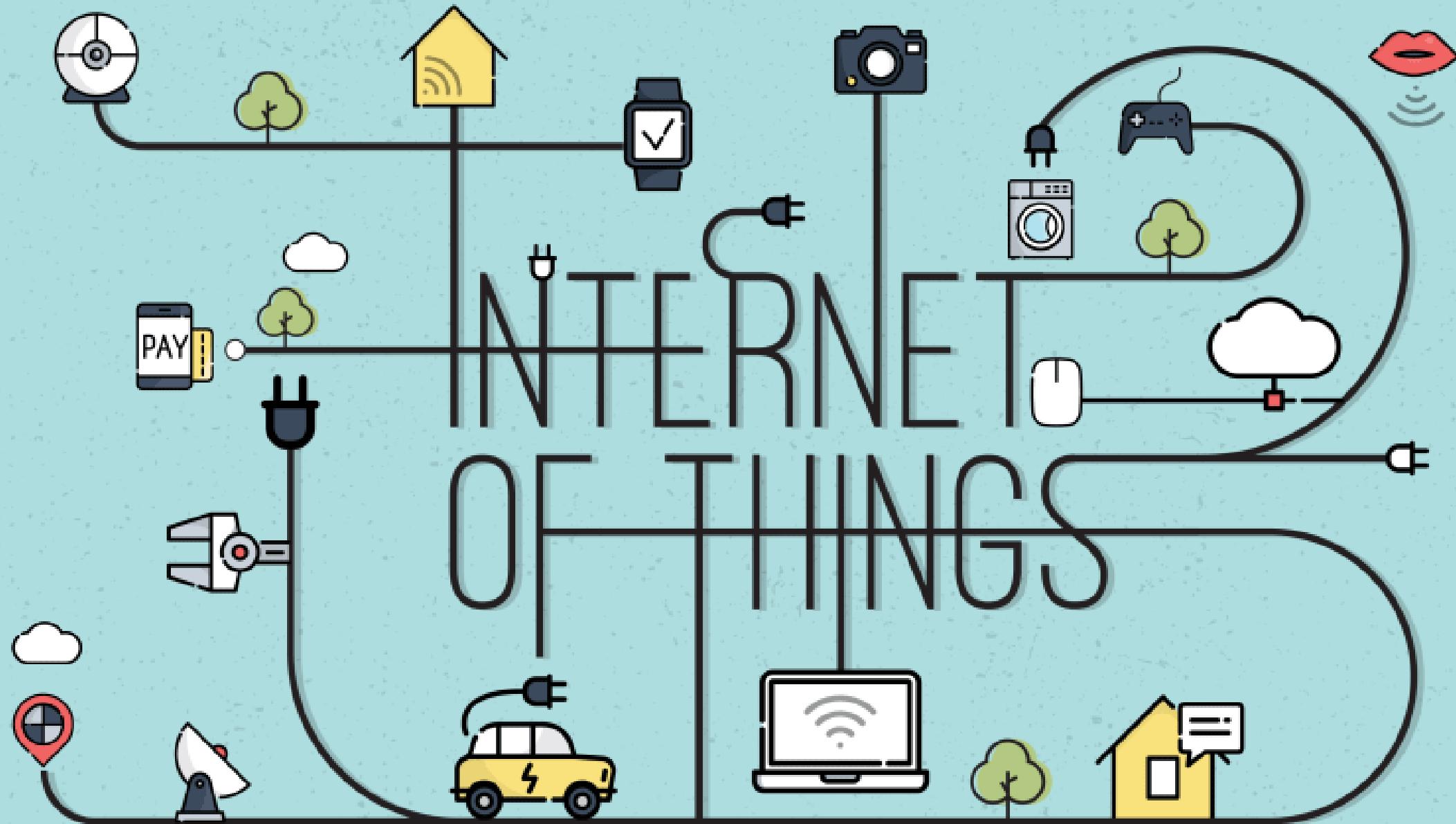




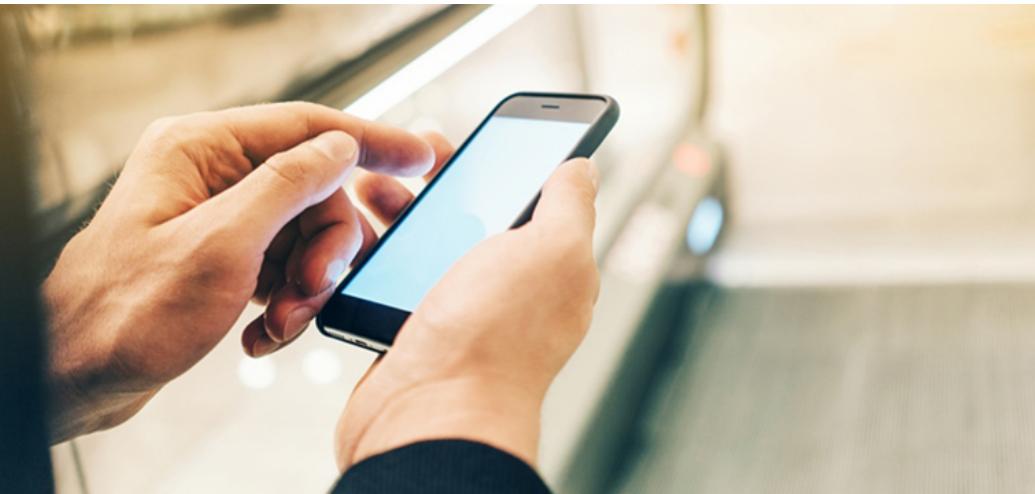


¿Qué es el IoT ?





Introducción al IoT



La idea de la Internet de las Cosas es que en lugar de tener un pequeño número de poderosos dispositivos de computación en tu vida, tienes un gran número de dispositivos de computación de bajo consumo energético y omnipresentes.

Varios nombres, un concepto

M2M (Machine to Machine)

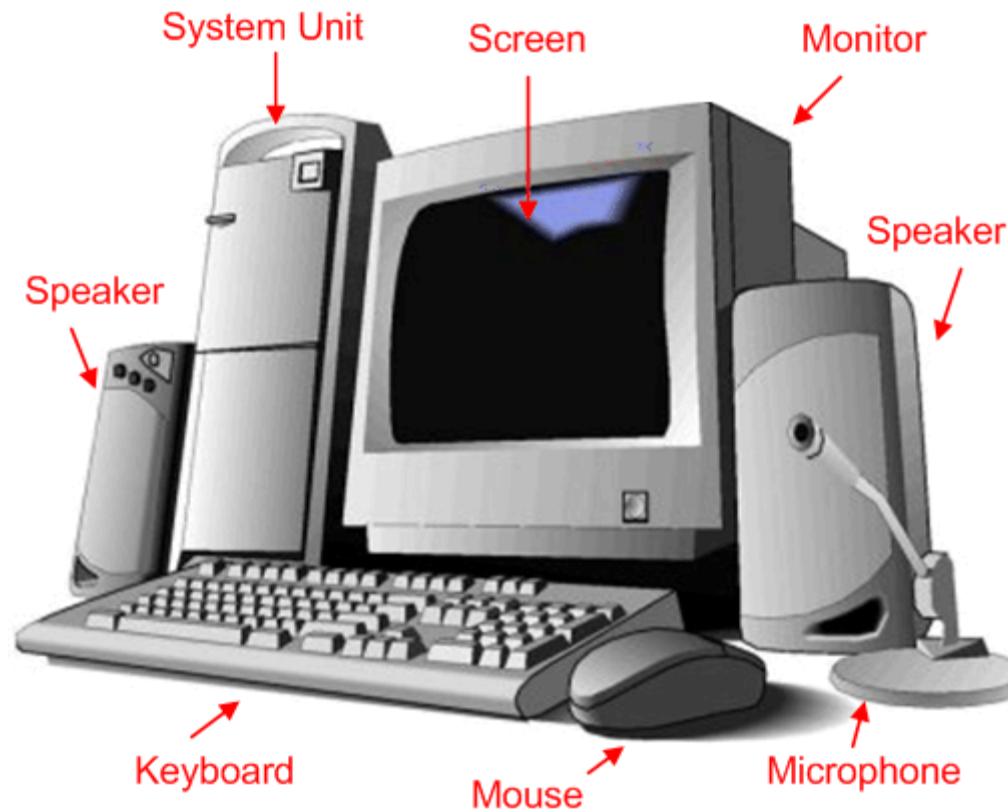
“Internet of Everything” (Cisco Systems)

“World Size Web” (Bruce Schneier)

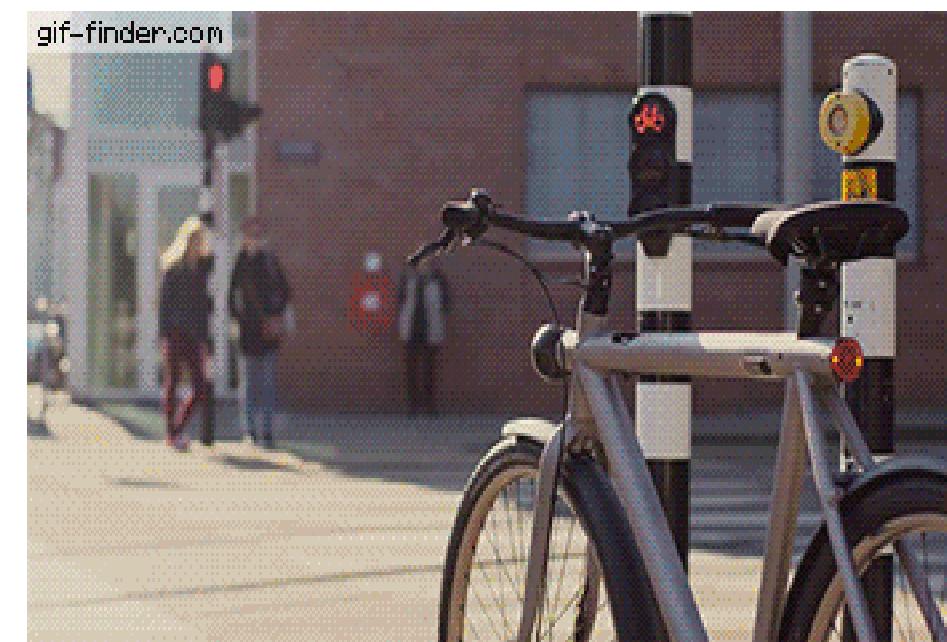
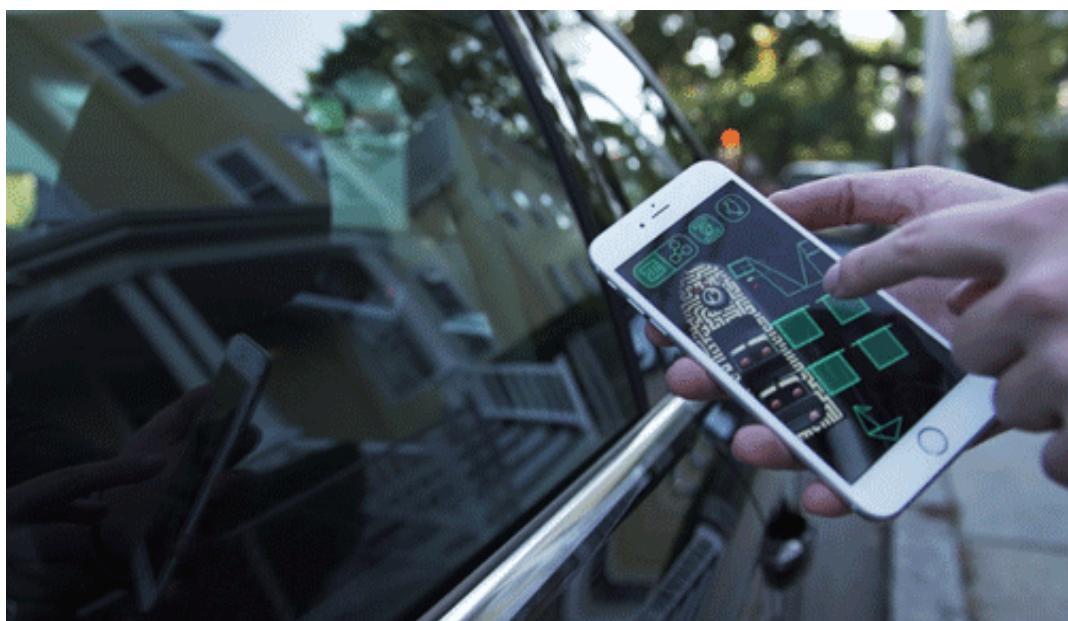
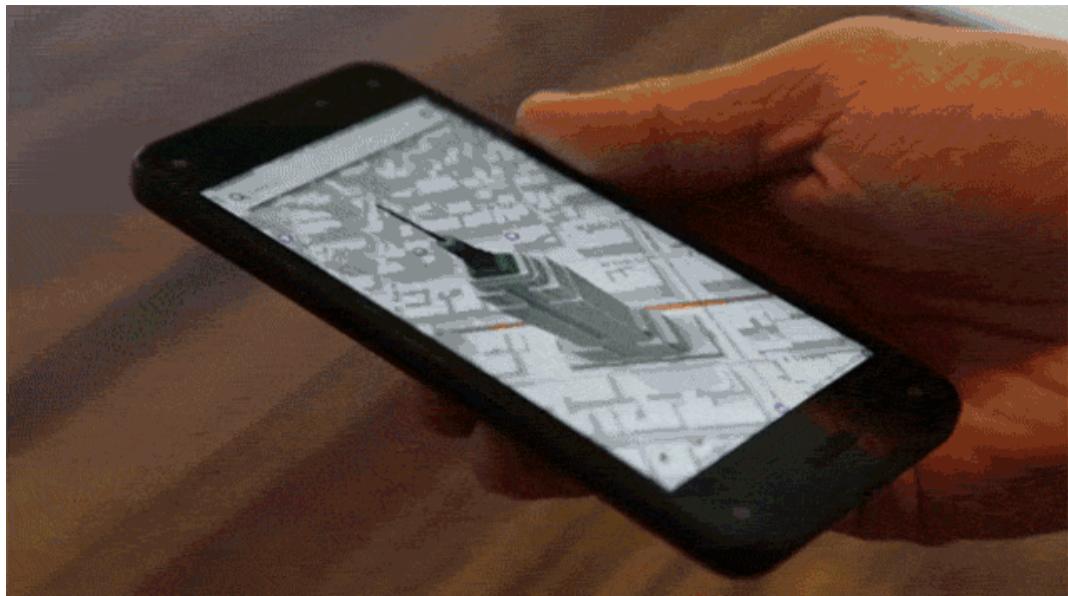




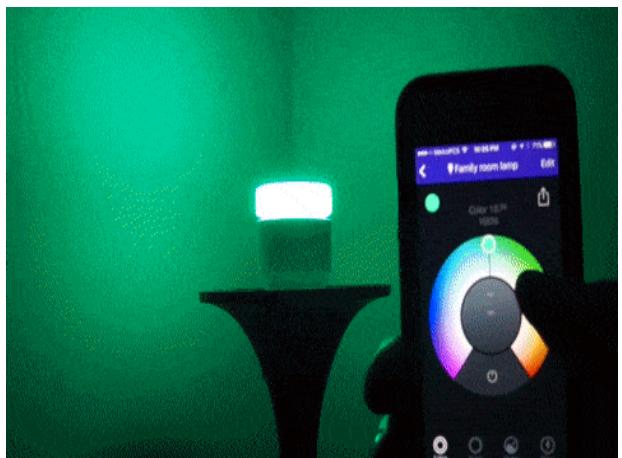








Dispositivos Inteligentes



Definición de IoT

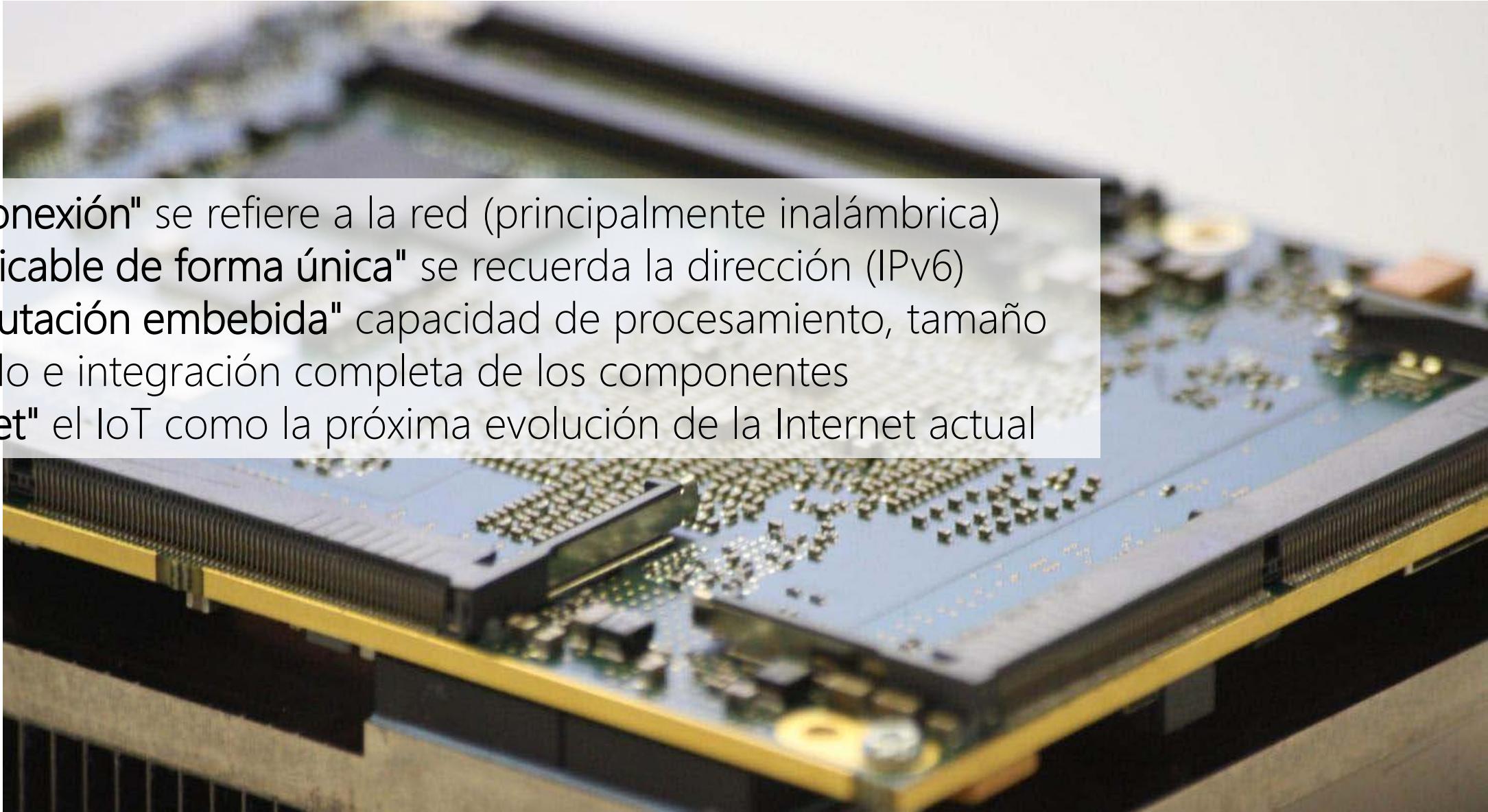
Definición de IoT



El Internet de las Cosas (IoT) es la **interconexión** de dispositivos electrónicos **embebidos** identificables de manera única dentro de la infraestructura de **Internet** existente.



- "Interconexión" se refiere a la red (principalmente inalámbrica)
- "Identifiable de forma única" se recuerda la dirección (IPv6)
- "Computación embebida" capacidad de procesamiento, tamaño reducido e integración completa de los componentes
- "Internet" el IoT como la próxima evolución de la Internet actual

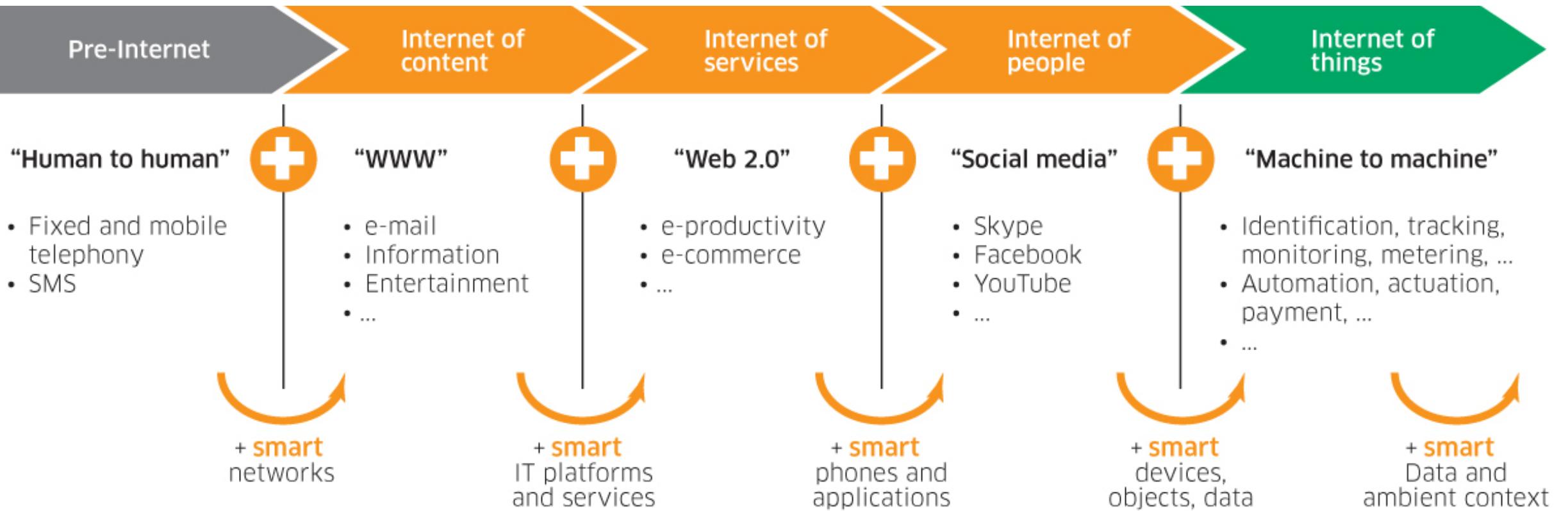




THE NETWORK OF THINGS

No es una Red de humanos

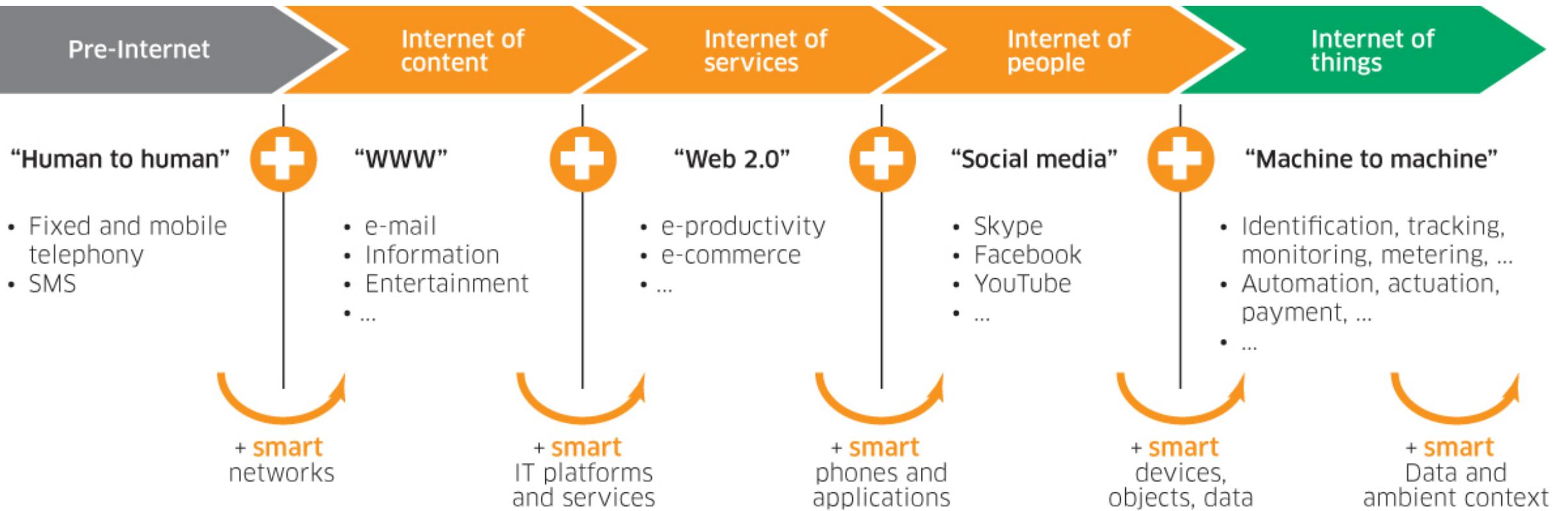
Del Internet de la gente a la Internet de las cosas





881/1
abc

It is great fun
to type in





Home • About • Help

Ask about CORPORATE SER

May I Suggest:

- MONEY
- TRAVEL
- HEALTH
- COMPUTERS
- ENTERTAINMENT
- FAMILY
- SHOPPING
- ASK JEEVES FOR KIDS!
- JUST CURIOUS, JEEVES

How can the web connect my Family? [MyFamily.com](#)

Ask Jeeves 

Have a Question? Just type it in and click Ask!

Most Recent Questions About Jobs:

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What are people asking [RIGHT NOW](#)

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Service marks of Ask Jeeves, Inc.

SEARCH All Products GO! Search of the Day: saffron

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Hello! Shopping at Amazon.com is 100% secure--gu... Already a customer? [Sign in](#).

BROWSE Books

Vote in our Millennium Poll--you could win 300 CDs,

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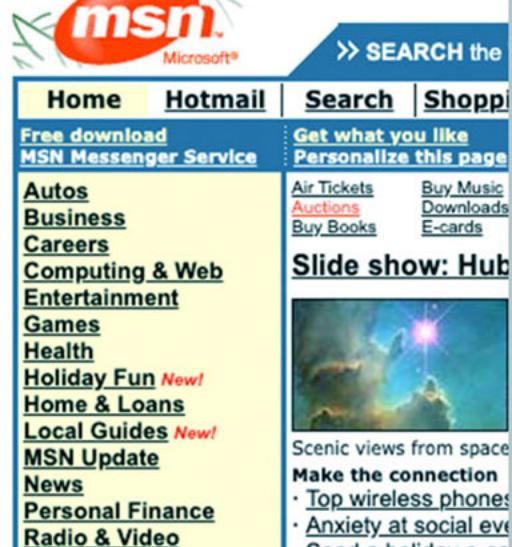
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D.COM AOL NetFind

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Take control of your finances help, advice

eBay categories

Automotive Antiques (69718) Books, Movies, Music (423766) Coins & Stamps (119881) Collectibles (962821) Computers (97268)

Tuesday Maps & I Don't ge find your with city regional Wet, Wil Outside: [eBay](#)

featurEd

Timex Indiglo Mens Watch *Dutch Epson Sc 400/500/600/700 Blk, Ink NEW! ChessMaster 6000 w/ Bruce 1999 Black Corvette 6500 Choice Uncirculated Old Whe Sapphires, Emeralds, & Rubies - Be more see all featured....

ebay Visa®

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YAHOO! What's New Check Email

New! South Park Movie Trailer beep beep Yahoo! Pager now works with chat

Search advanced search

Yahoo! Auctions - 100,000's of items to bid on - [Star Wars](#), [Pokemon](#), [Hot V](#)

Shopping - Yellow Pages - People Search - Maps - Travel Agent - Classifieds - Personals - G...

Email - Calendar - Pager - My Yahoo! - Today's News - Sports - Weather - TV - Stock Quote

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Regional Countries, Regions, US States...

Entertainment Cool Links, Movies, Humor, Music...

Science Biology, Astronomy, Engineering...

Government

Social Science

In the

NATO bombing embassy in B...

Jenny Jones' negligent in g...

NHL Playoff...

Market

Shop for Mot...

Top selling vi...

Inside Y...

Y! Movies - previous info...



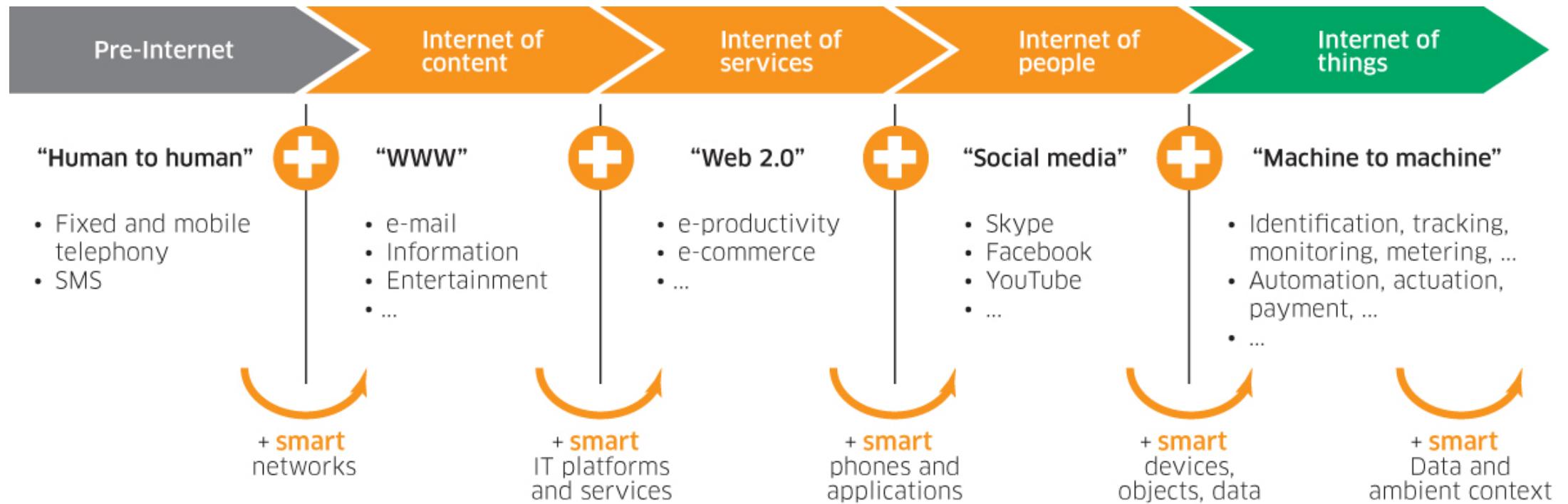
EN MIS TIEMPOS

SE USABA MSN Y LATINCHAT

memegenerator.net

Características del Internet de las cosas

- Altamente conectado
- Inteligente
- Cosa = No necesariamente un ordenador/teléfono/tableta
- Red/interfaz del mundo físico



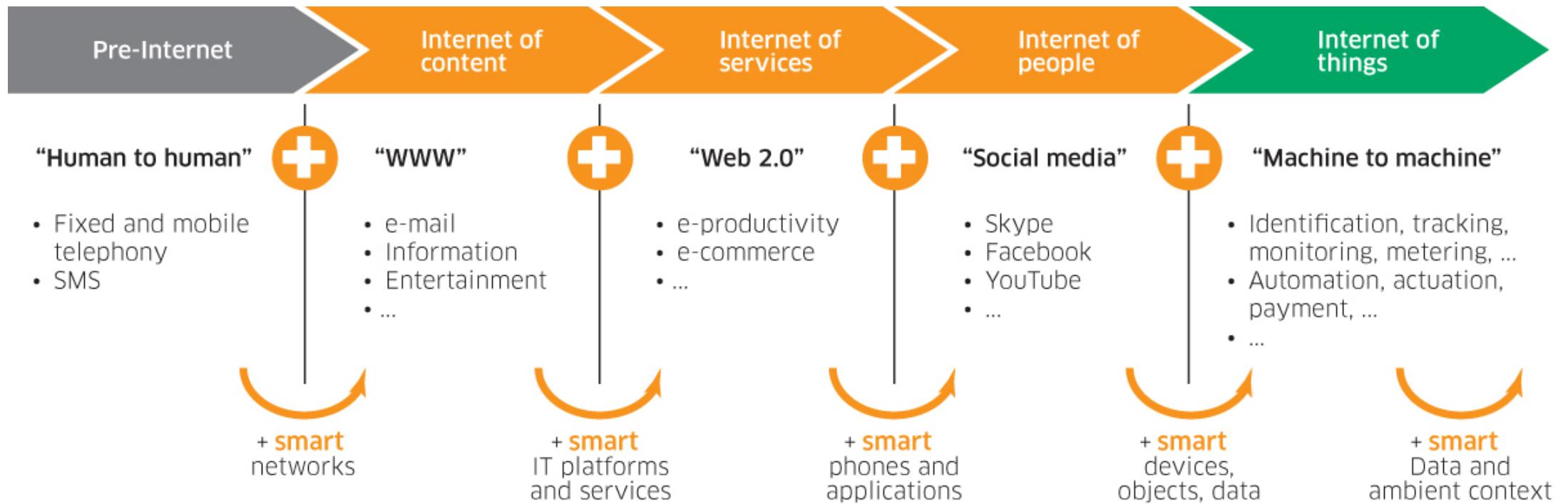


The word "moodle" is written in a large, bold, orange sans-serif font. The letter "m" is unique as it features a black graduation cap resting on its top left stroke. The cap has a dark gray or black cap and a white tassel.

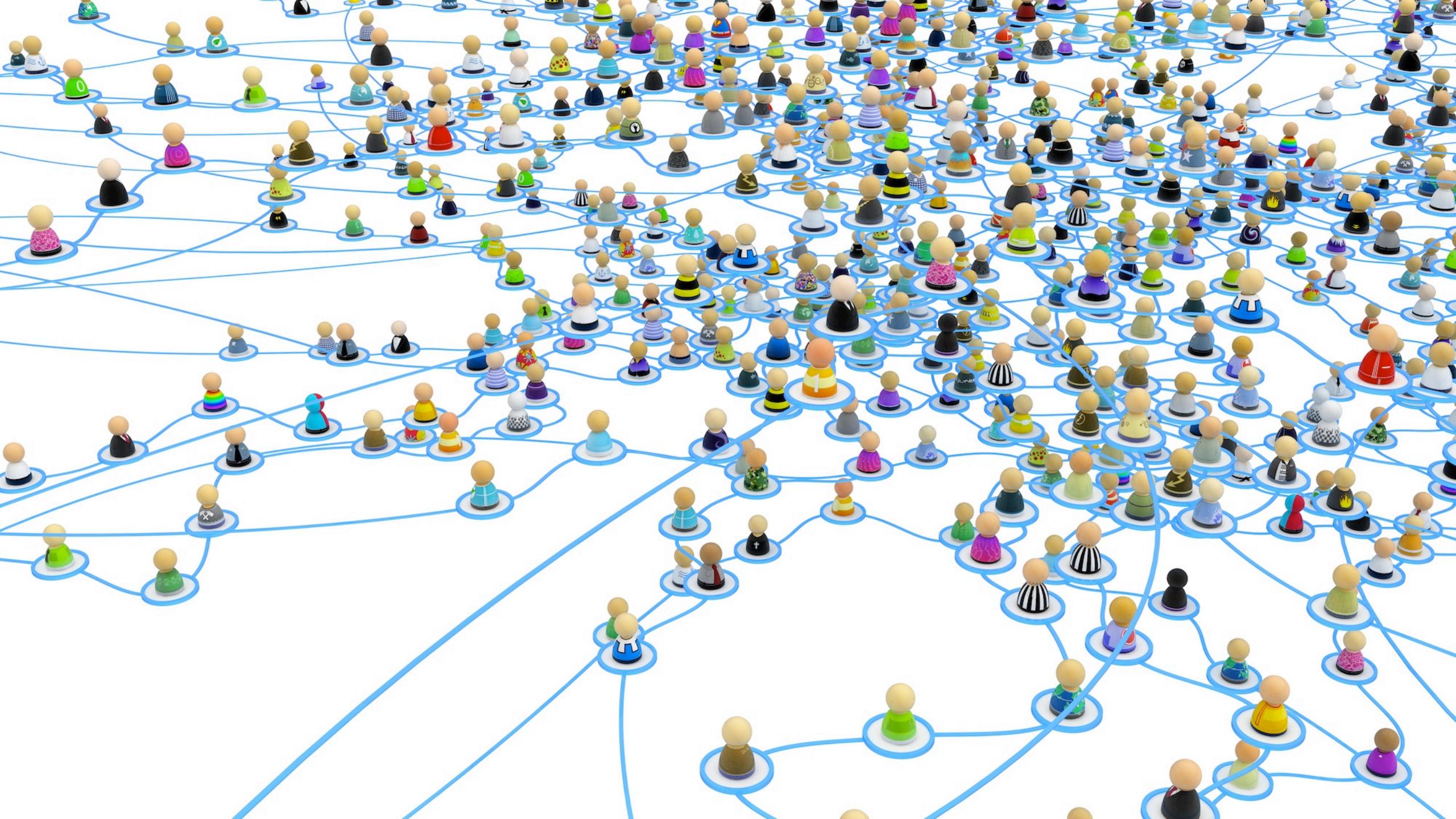
moodle

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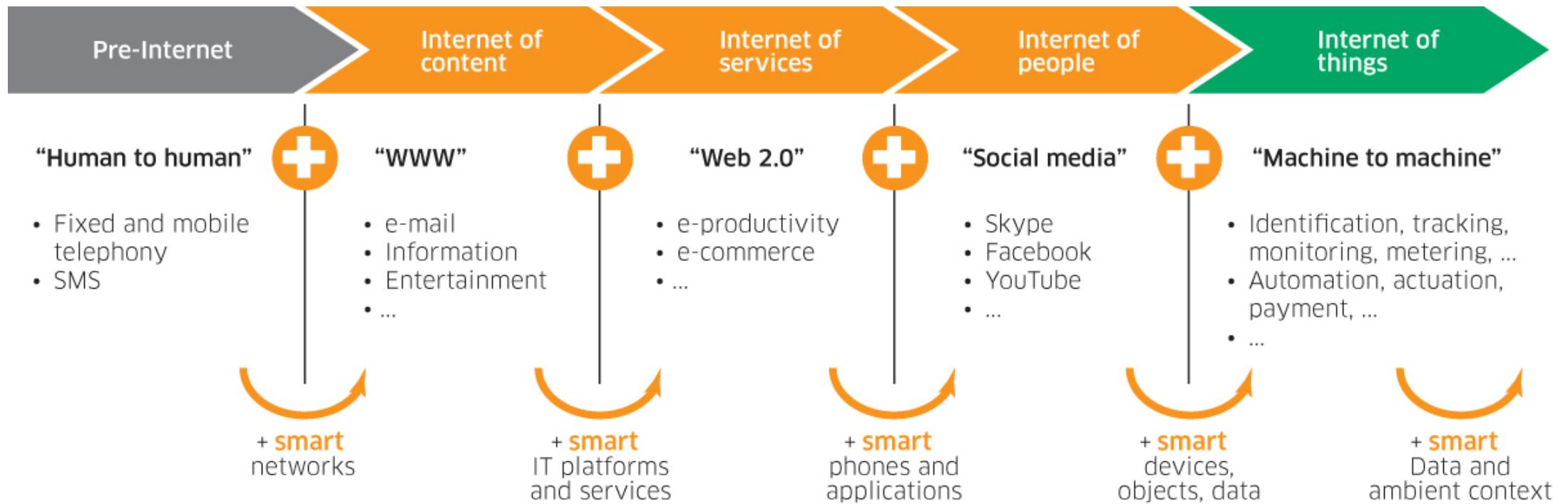


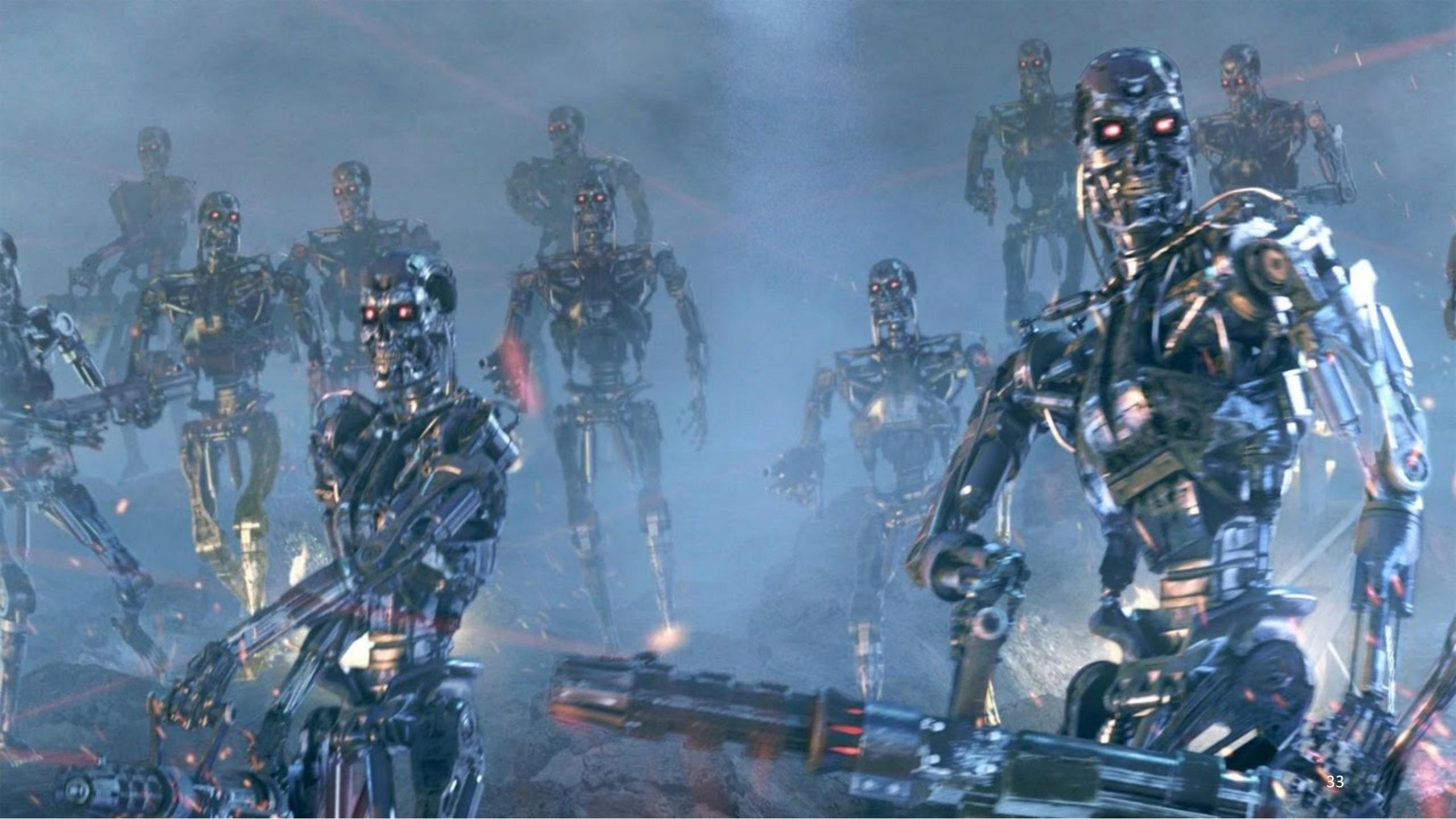
∞ Meta



Características del Internet de las cosas

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- Red/interfaz del mundo físico





Características del IoT

Población mundial: 7,2 mil millones

Población de usuarios de Internet: 3.000 millones

Para 2020, se esperaba que los dispositivos conectados:

- 26.000 millones según Gartner
- 30.000 millones según ABI
- 50.000 millones según Cisco



50 billion
Connected devices in the Internet of Things by 2030¹



53.8%

Drop in average cost of sensors over last 10 years²



60x
Reduction in cost of processing over last 10 years³



40x
Reduction in cost of bandwidth over last 10 years⁴

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Big Data is doubling every **18 months**⁵

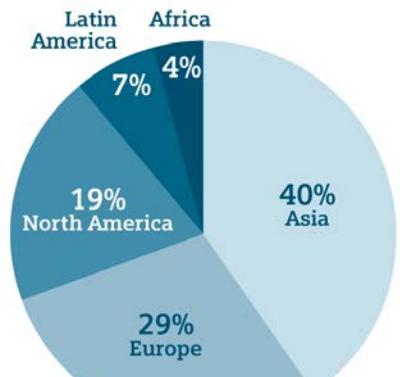


1.87 billion

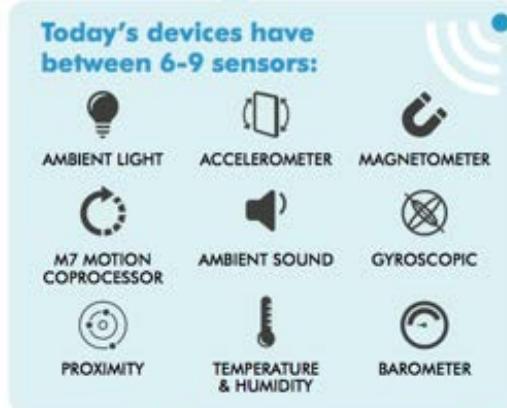
Global shipments of smartphones predicted by 2018⁶

Machine to Machine Communication: Asia is leading

M2M-Market Share worldwide (2013)



Source: GSMA

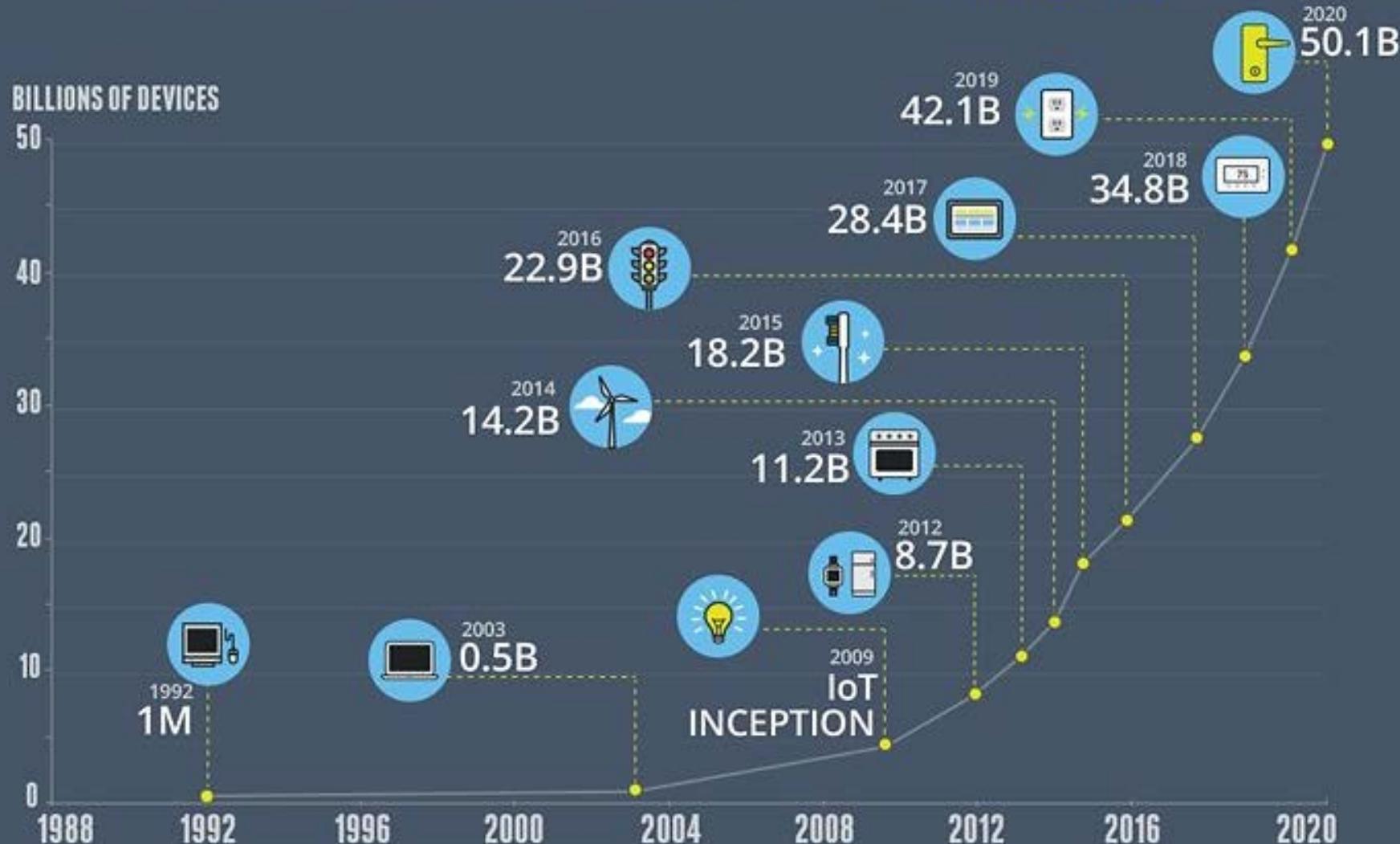


The Rise of Sensors
Sensors enable IoT. Every object, even the human body.

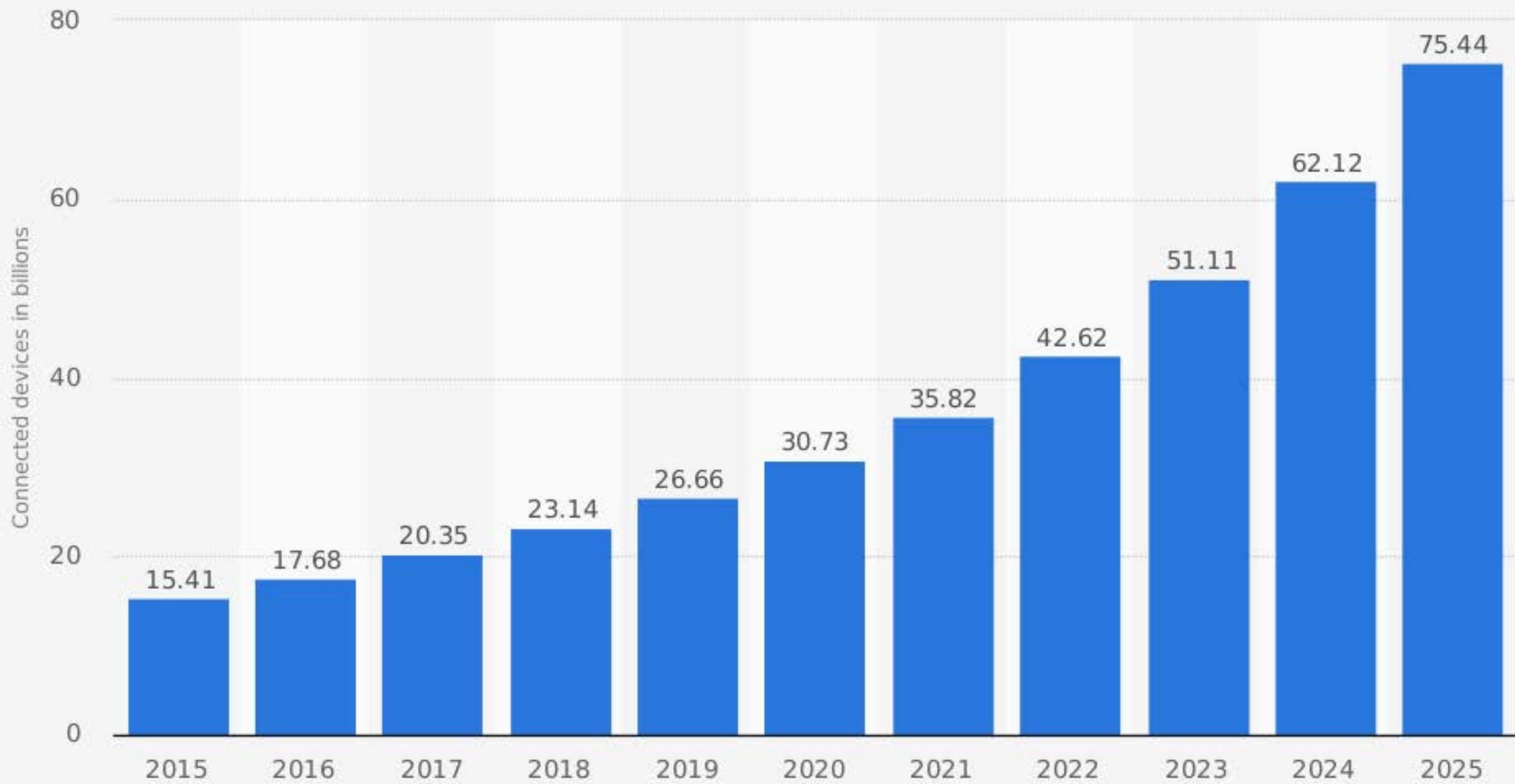


GROWTH IN THE INTERNET OF THINGS

THE NUMBER OF CONNECTED DEVICES WILL EXCEED 50 BILLION BY 2020

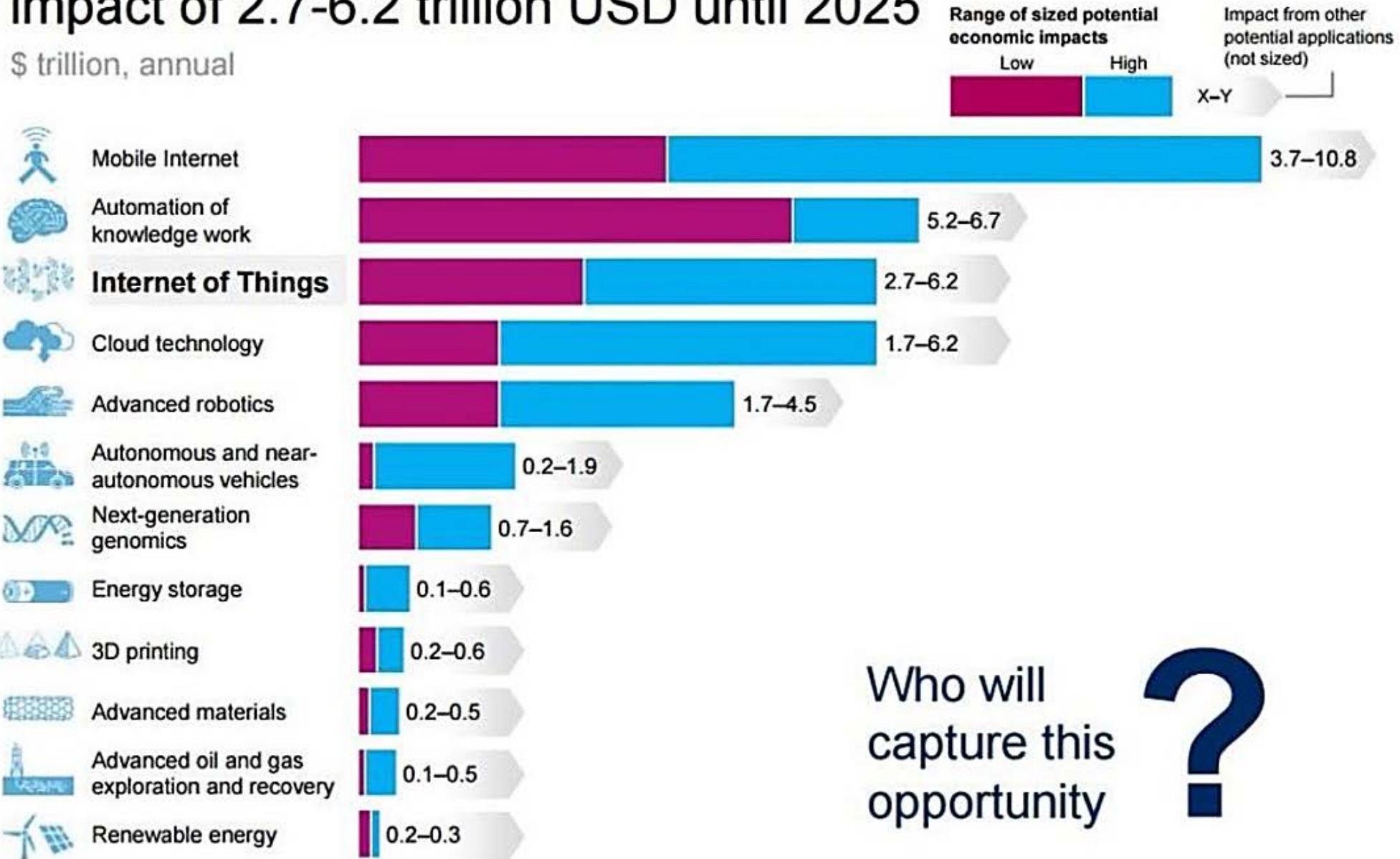


Source: Cisco



The Internet of Things (IoT) has a potential economic impact of 2.7-6.2 trillion USD until 2025

\$ trillion, annual



Who will capture this opportunity

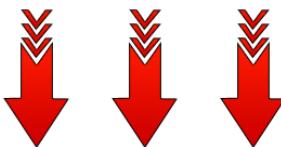


¿Explosión del IoT?

Costo sensores



Costo conectividad

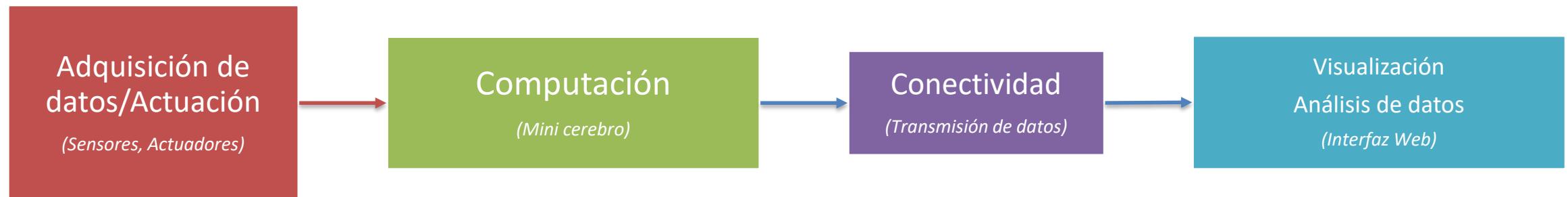


Costo procesamiento

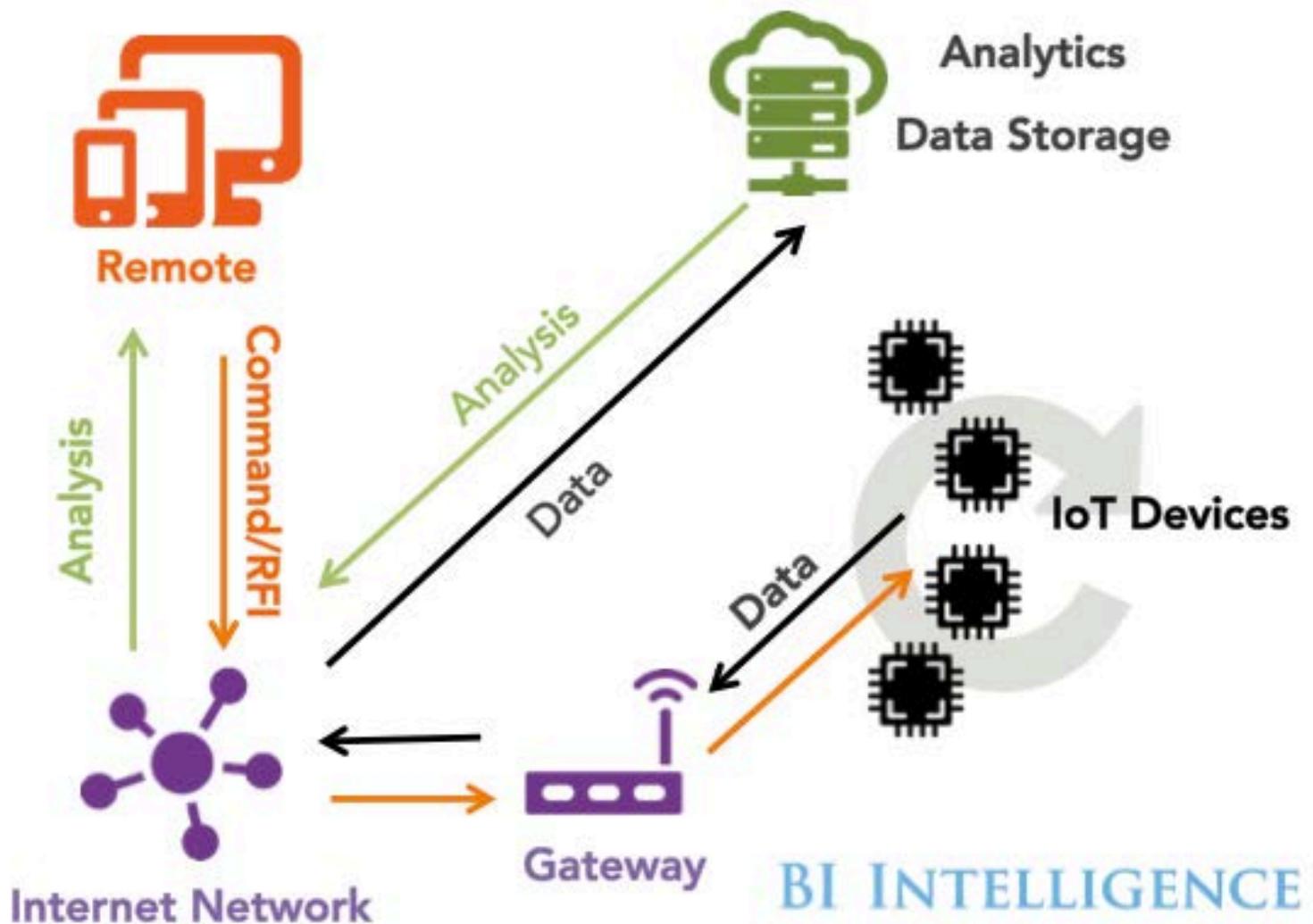
Modelo básico de IoT

Un modelo básico de IoT

Un modelo simple IoT contemplaría los siguientes módulos:



The Internet of Things Ecosystem



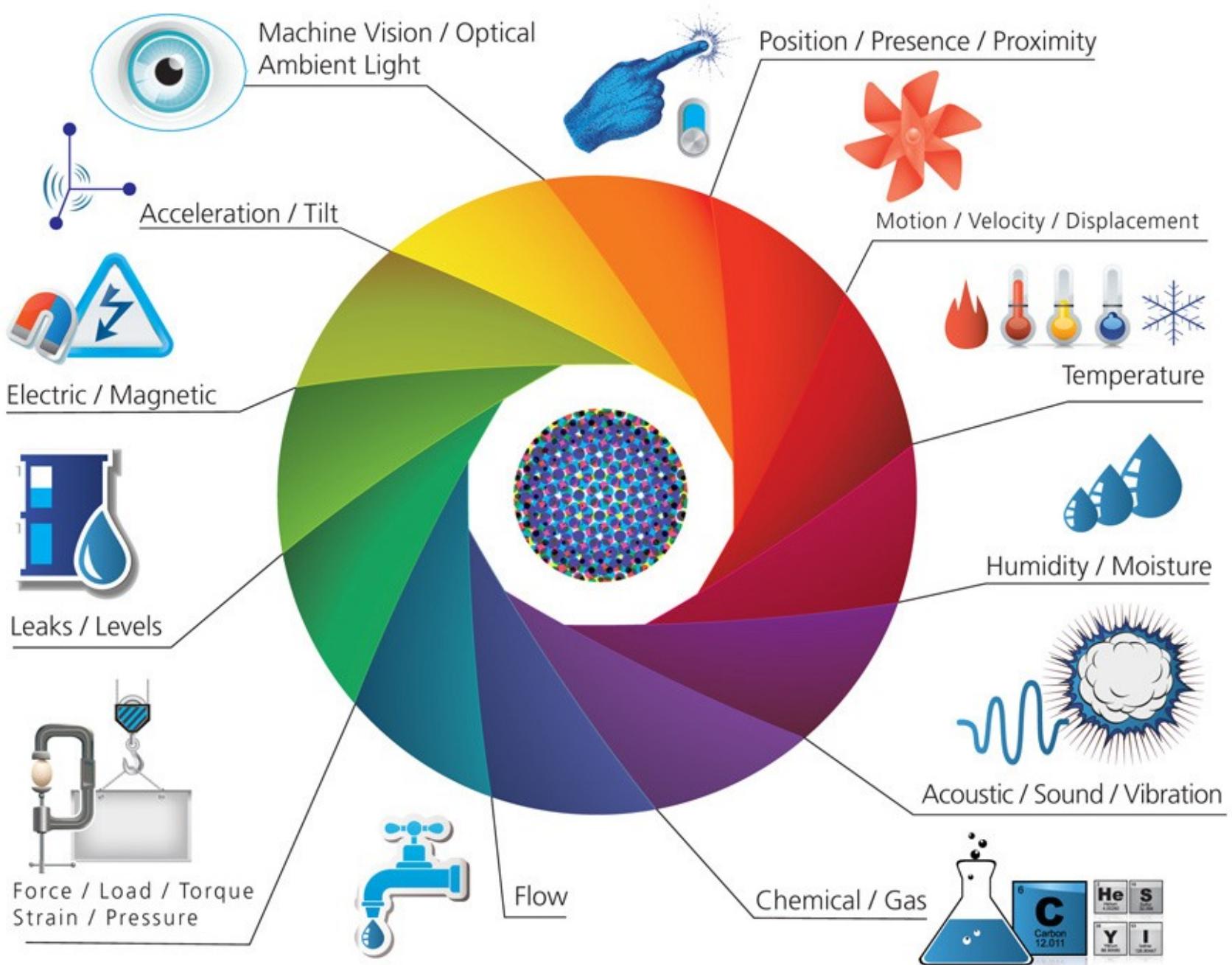
Sensores y actuadores

- “Dispositivo electro-mecánico que puede detectar y medir magnitudes físicas o química”
- Transforman las magnitudes en señales eléctricas

Pueden medir:

- Temperatura/humedad/presión
- Posición/presencia/proximidad
- Movimiento/velocidad/acceleración
- Niveles de líquidos/filtraciones
- Gases....







Moisture



Flex



Touch



Solar light



Metal detection



RTC



Vibration



Thermistor



Infrared



Ultrasonic



Gyro



**Accelero
meter**



Color



PIR



GAS



Smoke



Temperature



LDR



Rainfall



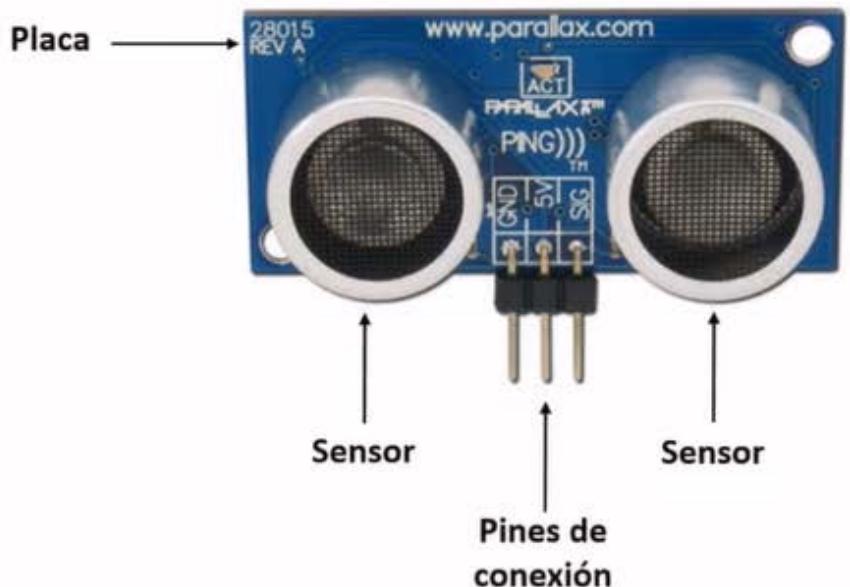
**Soil
Moisture**

Sensores y actuadores

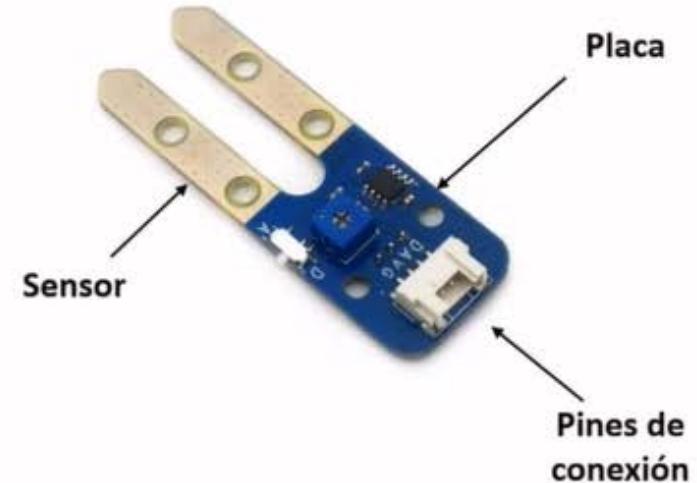


Sensores y actuadores

- Proximidad

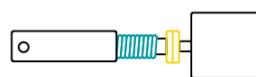


- Humedad



Sensores y actuadores

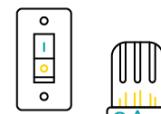
"Dispositivo que convierte una señal eléctrica en una acción o movimiento que afecta su entorno"



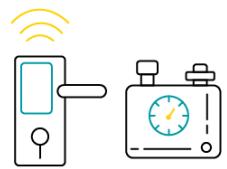
Linear actuators



Motors



Relays



Solenoids

Ejemplos:

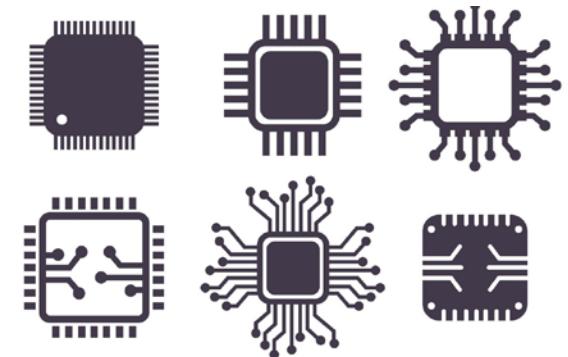
- Motores
- Servos
- LEDs/Displays
- Resistencias
- Válvulas
- Ventiladores....

Computación y Conectividad

- “Dispositivo electrónico que recibe la señal de uno o varios sensores”
- “Toma decisiones de acuerdo a su programación”
- “Activa o acciona los actuadores”

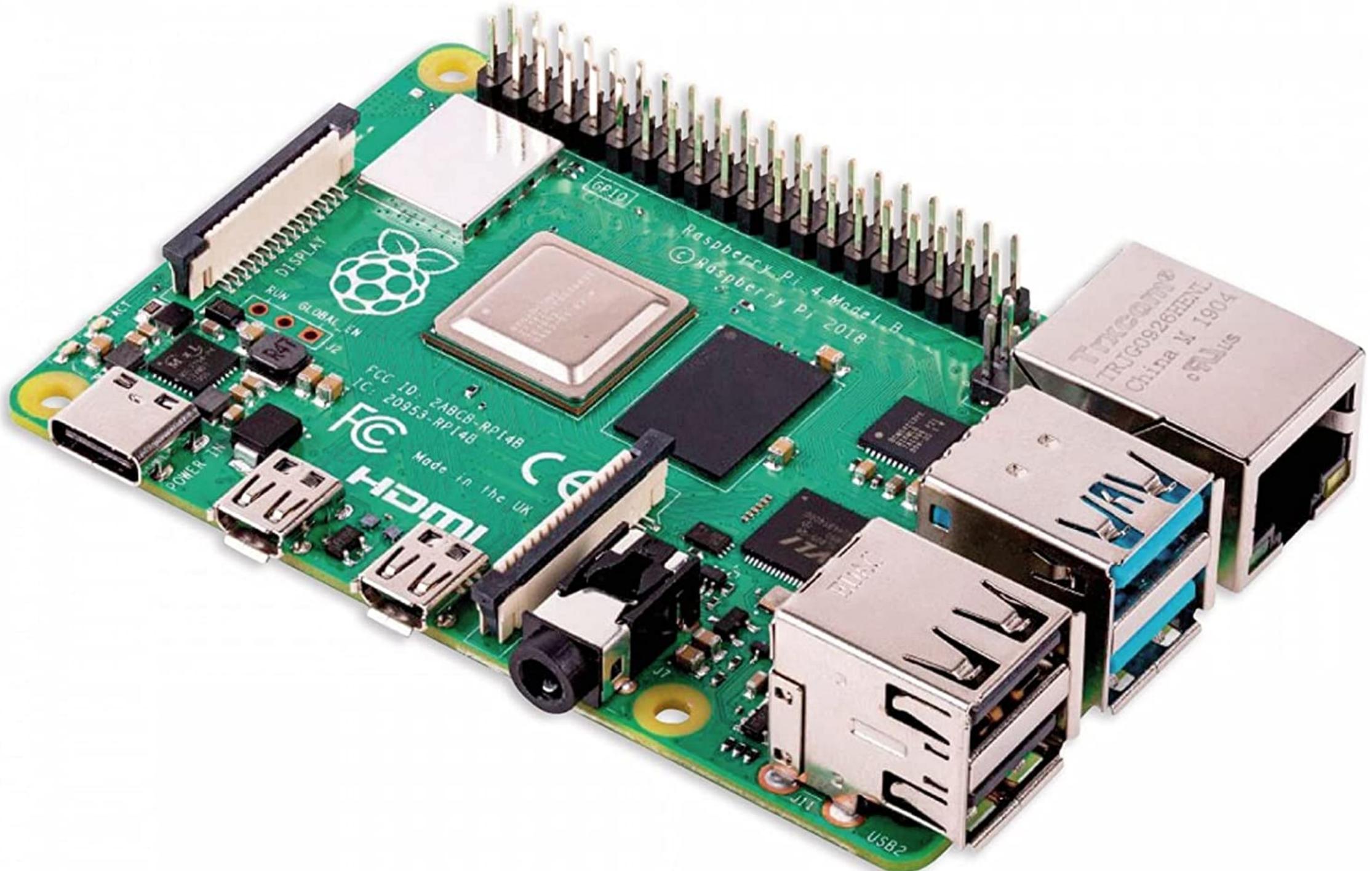
Características de los Sistemas embebidos

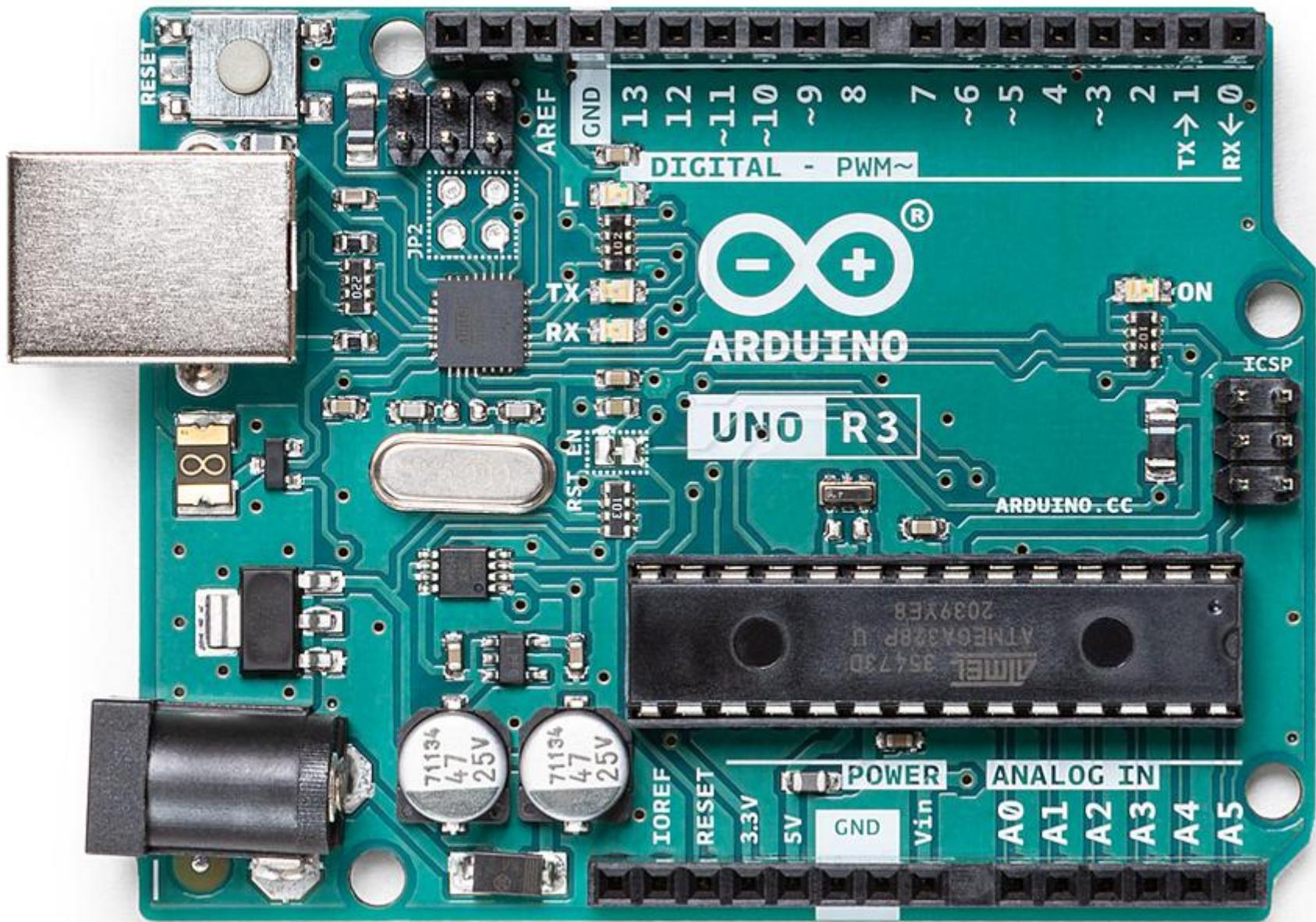
- Aplicación específica
- Fiabilidad
- Con una sola función (sistema dedicado)
- Con restricciones estrictas (eficiente)

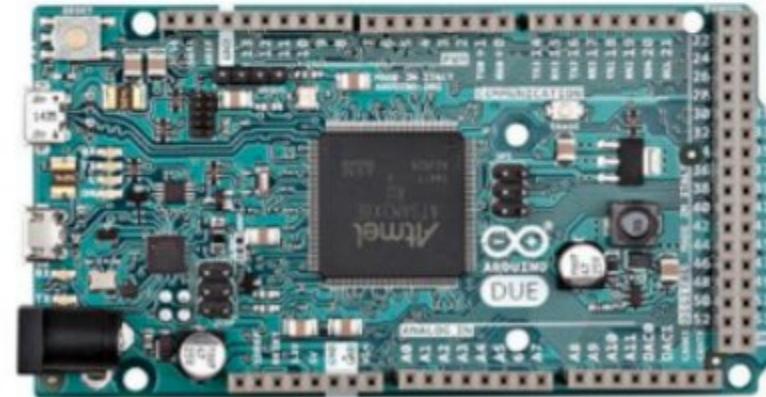
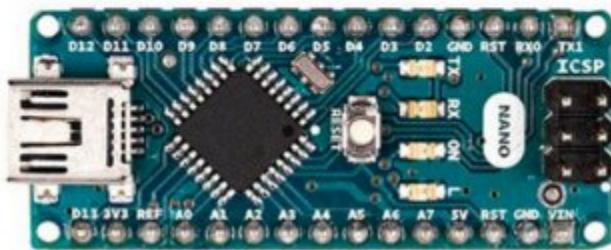


- A menudo se interconectan con sensores para obtener información de los parámetros del proceso
- Diseñado para funcionar en entornos difíciles
- Reactivo y en tiempo real

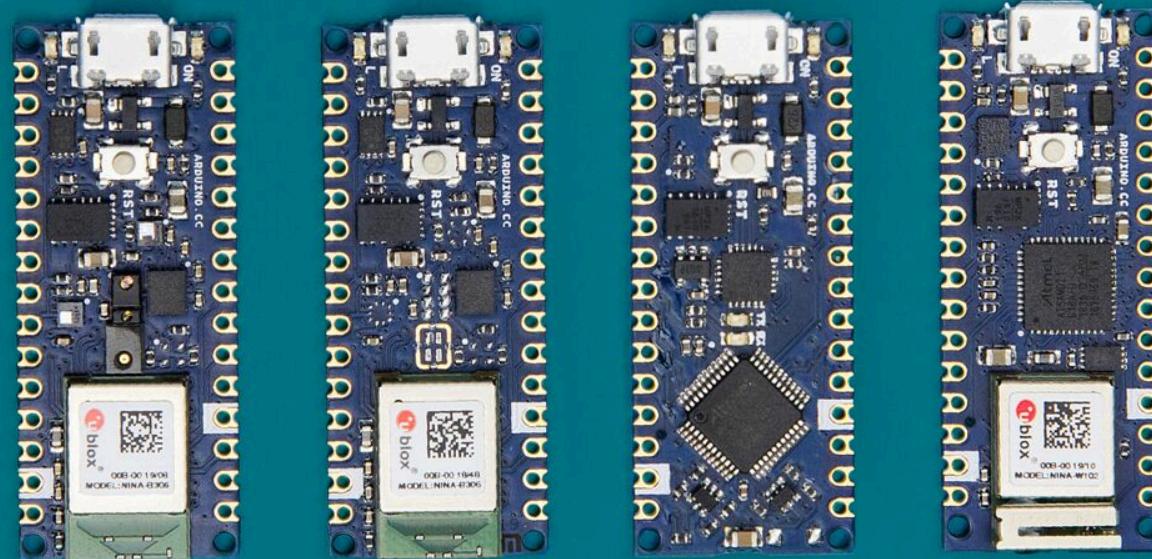








Let's make big ideas real.
Pre-Order Now!

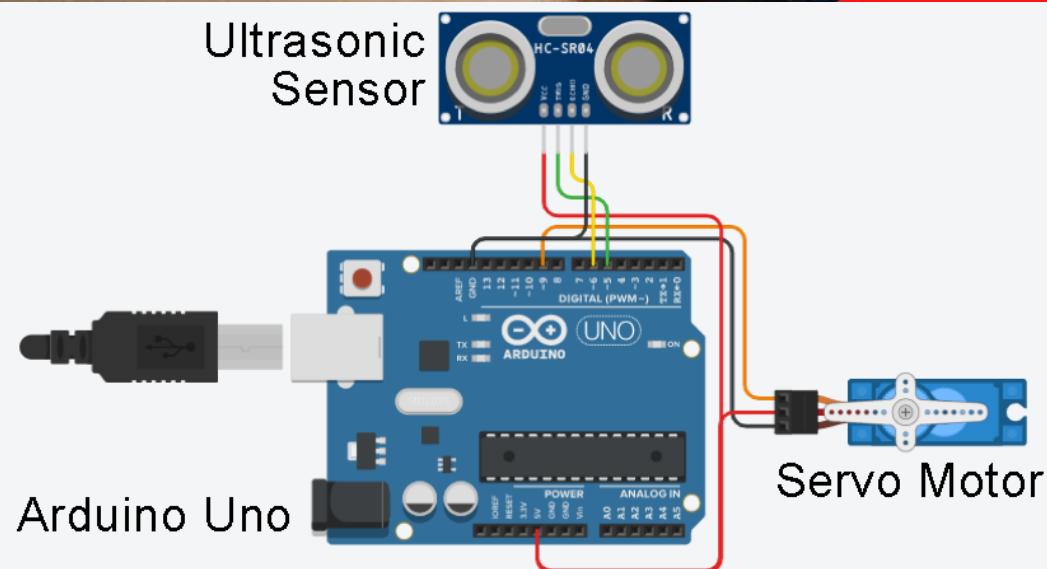


 ARDUINO
NANO
FAMILY

**JUST
A DIY**

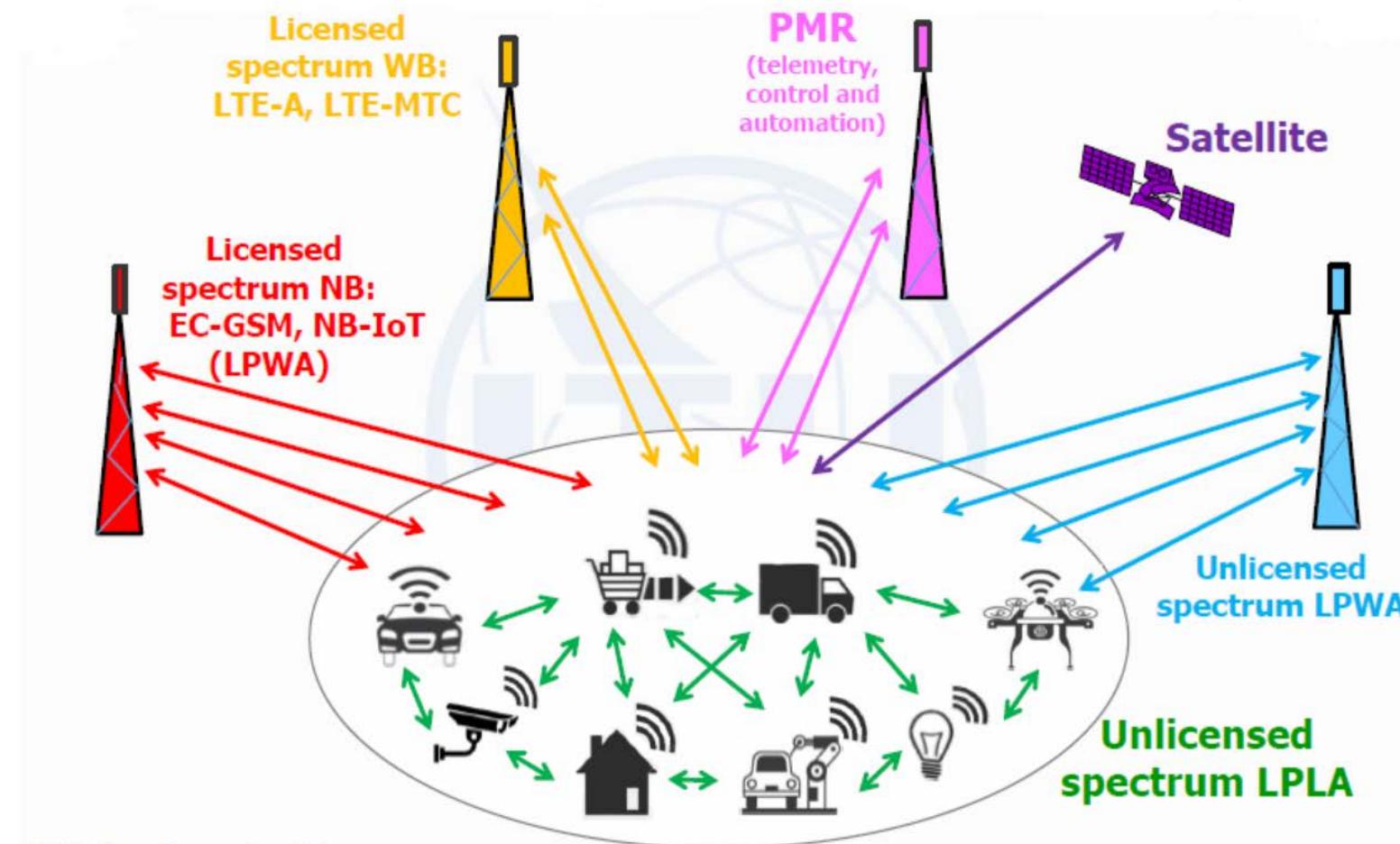


AUTO



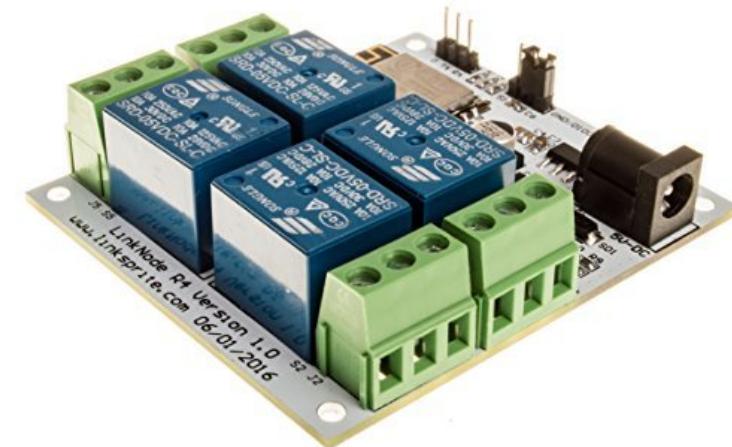
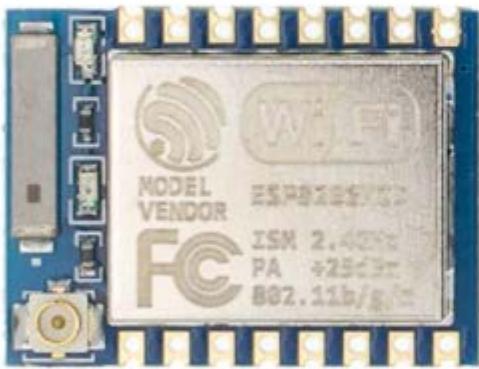
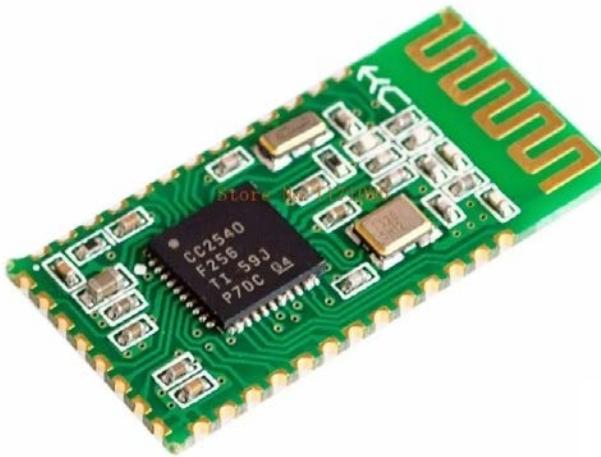
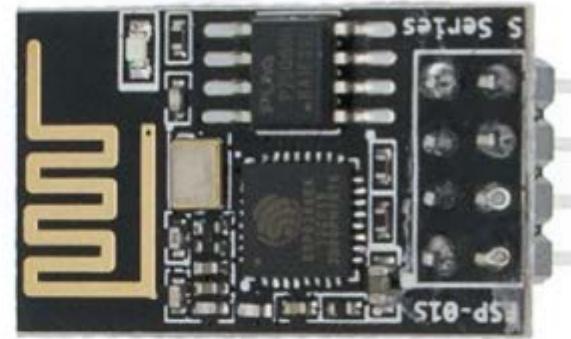


Comunicaciones IoT

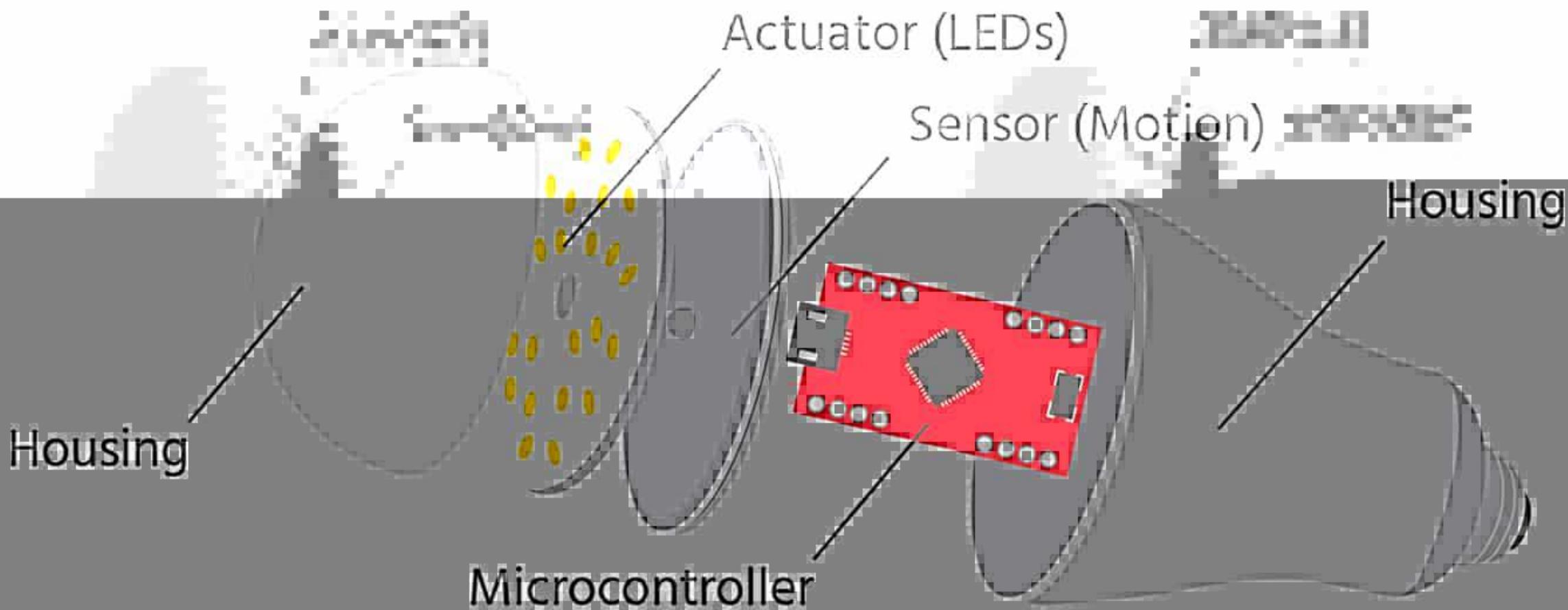




Standard	ZigBee (WPAN)	Low Power Wi-Fi (WLAN)	LoWPAN (LPWAN)	LoRaWAN (LPWAN)	NB-IoT (LPWAN - cellular)	LTE-M (LPWAN - cellular)	5G (cellular)	Wi-Sun (WNAN)
Nominal range	10 -100 m	70 m - 225 m	25 - 50 m	2 - 15 Km	1 - 15 Km	1 - 11 Km	up to 100 km	5 - 10 km
Max Data Rate (Kbit/s)	250 Kbps	15 Mbps	250 Kbps	50 Kbps	250 Kbps	1 Mbps	599 Mbps	300 Kbps
Power consumption	Medium	Low to medium	Low	Low to medium	Low	Low	Low to medium	Medium to high



WiFi



Dispositivos IoT



1) Sensores

- Nivel de agua
- Presencia del vaso
- Temperatura

2) Actuadores

- Válvulas de café y agua caliente

3) Mini-cerebro

- Arduino "potente"

4) Conectividad

- WiFi, Bluetooth

5) Interfaz de usuario

- Celular

6) "Inteligencia"

- Aprende nuestros gustos de café
- Conoce nuestros horarios de café
- Prepara nuestro café sin órdenes

El Poder de la Nube





Google Cloud Platform





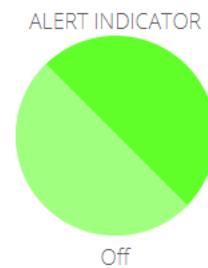
Main Dashboard

WATER USAGE



ALERT INDICATOR

ALERT INDICATOR



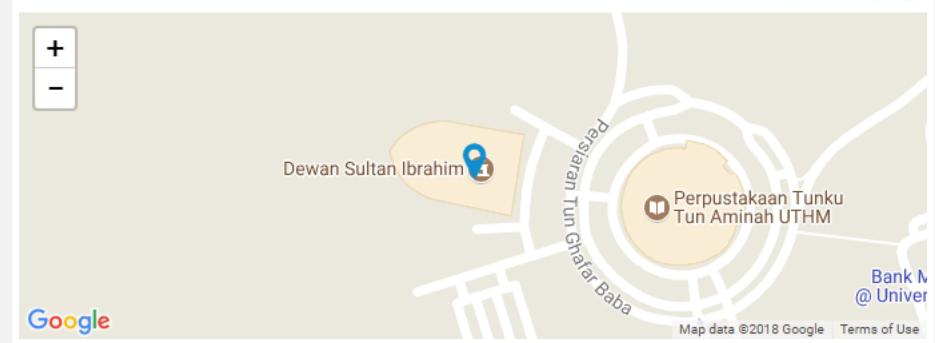
The WATER USAGE today was

23.85

litre



SYSTEM LOCATION



DISTANCE APPROXIMATE

Pipe Leakage **Detected**

0.00

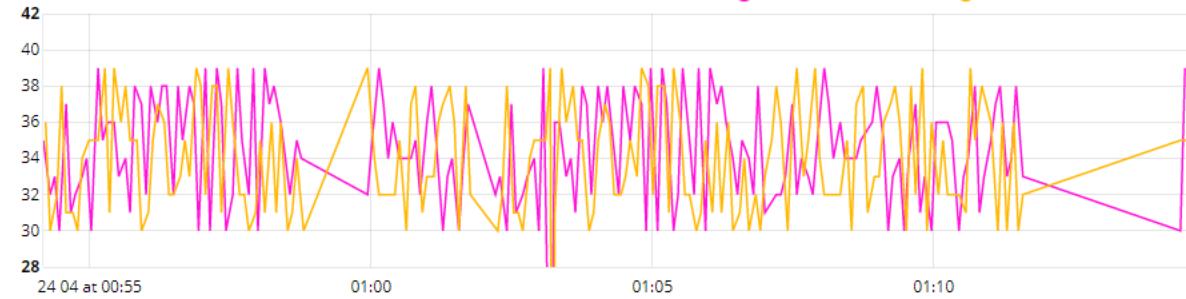
meter

from **System Node 1**

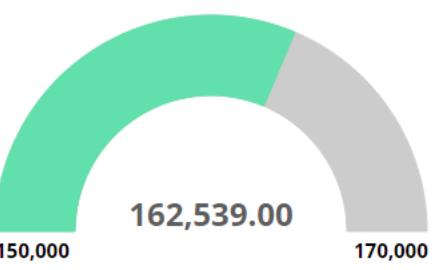
WATER FLOW SENSOR 1 , WATER FLOW SENSOR 2



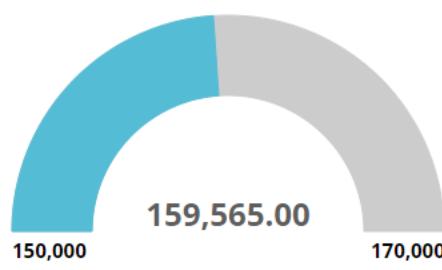
● WATER FLOW SENSOR 1 ● WATER FLOW SENSOR 2



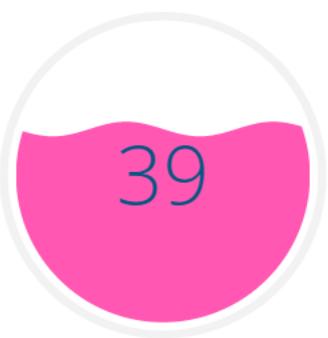
WATER PRESSURE SENSOR 1



WATER PRESSURE SENSOR 2



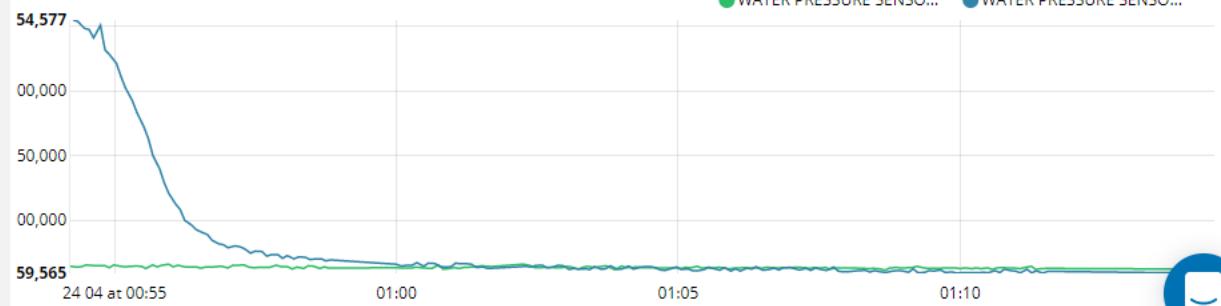
WATER FLOW SENSOR 1

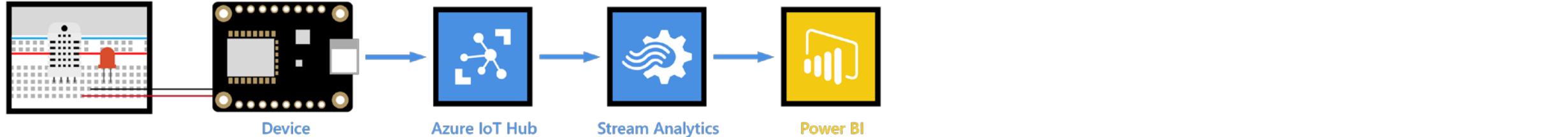


WATER FLOW SENSOR 2



WATER PRESSURE SENSOR 1 , WATER PRESSURE SENSOR 2





CSC IOT ANALYTICS

STORE COUNT
14

4.45K
VOLUME TOTAL

63.91K
WEIGHT TOTAL

NOT DELIVERED

DEL_SEQ	CURRENT_STATUS	ETA_DELIVERY	ADJUSTED_ETA
6	Next Delivery	6/8/2016 2:05:19 AM	6/8/2016 4:41:46 AM
7	On It's Way	6/8/2016 2:43:27 AM	6/8/2016 5:08:46 AM
8	On It's Way	6/8/2016 2:52:17 AM	6/8/2016 5:40:46 AM
9	On It's Way	6/8/2016 3:28:45 AM	6/8/2016 6:02:46 AM
10	On It's Way	6/7/2016 9:54:52 PM	6/8/2016 6:26:46 AM

DELIVERY COMPLETED

DEL_S...	ETA_DELIVERY	ARRIVE_DATETIME	DEPART_DATETIME	DURATION (TOTAL ...
5	6/8/2016 1:28:57 AM	6/8/2016 1:06:11 AM	6/8/2016 1:33:46 AM	27.58
4	6/8/2016 12:52:49 A...	6/8/2016 12:30:16 A...	6/8/2016 12:51:06 AM	20.83
2	6/8/2016 12:02:22 A...	6/7/2016 11:40:50 PM	6/7/2016 11:59:32 PM	18.70
3	6/8/2016 12:26:57 A...	6/8/2016 12:03:41 A...	6/8/2016 12:20:26 AM	16.75
1	6/7/2016 11:31:50 PM	6/7/2016 11:10:21 PM	6/7/2016 11:23:23 PM	13.03

ROUTE NUMBER & VEHICLE ID
42 - 844787
▼

CURRENT_STATUS
All
▼

Cases by Region

● Delivered ● Next Delivery ● On It's Way

The map displays a network of roads in Spokane, Washington, with various delivery points marked. Grey circles represent 'Delivered' cases, while red circles represent 'On It's Way' or 'Next Delivery' cases. Specific locations labeled include Mile, FIVE MILE PRAIRIE, NORTHWEST ST, Division St, LOGAN, Hillyard, YARDLEY, Millwood, and Spokane Valley. Major roads like 395, 2, 90, and 15 are also visible.

ADDR_NAME	ADDRESS_L1	STOP_NUM
Starbucks #3284	506 N. SULLIVAN	114
Starbucks #27399	1605 N GREENE STREET	113
Starbucks #3200	1217 N. HAMILTON	112
Starbucks #8655	170 S. DIVISION ST	111
Starbucks #3269	721 W. MAIN	110
Starbucks #3450	2703 N. DIVISION STREET	109
Starbucks #14719	NORTHTOWN SQUARE 4727 N. DIVISION ST	108

