INTERNET OF THINGS (IoT)

Welcome

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NEON
Network of Competence on Internet of Things

Co-funded by the
Erasmus+ Programme
of the European Union

UNC
Universidad
Nacional
de Córdoba

FCEFyN
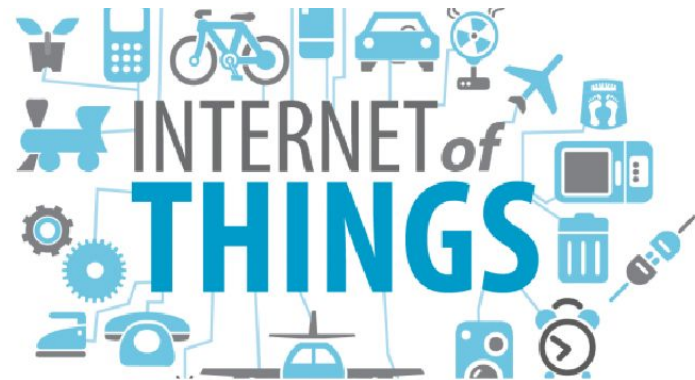FACULTAD DE CIENCIAS EXACTAS, FÍSICAS y NATURALES

Why IoT?

Internet of Things (IoT)

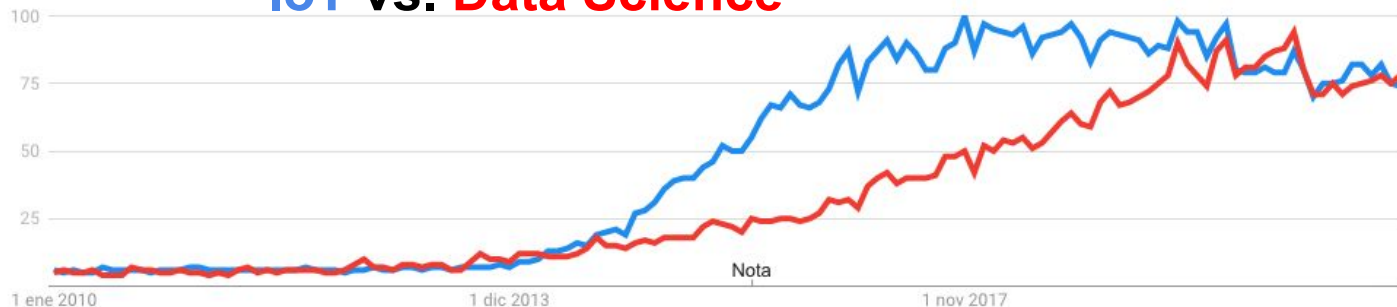Just 2 words (actually three…) but lot to be said.

Google Results: 5.270.000.000
Google News: 862.000.000
Google Videos: 431.000.000

Google Trends:
IoT vs. Data Science

IoT is an Opportunity

INTERNET OF THINGS

TAKE THINGS FURTHER
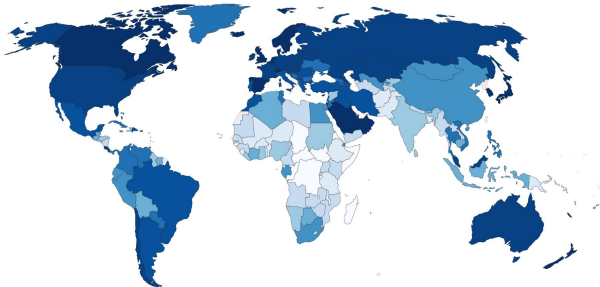
Internet Users

2022: 4.9K millions users (~60%)

6 out 10 persons have Internet access

Users have doubled in only 10 years

Grow rate of 3-4% per year

Internet penetration non-uniform

No data 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
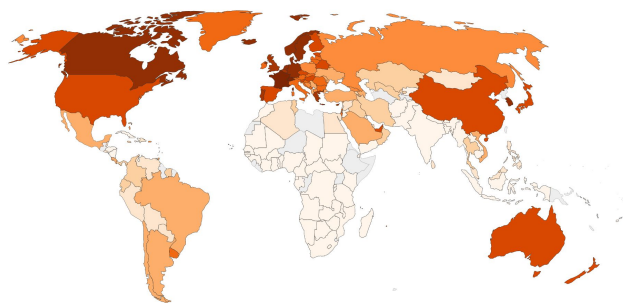
Individuals using the Internet
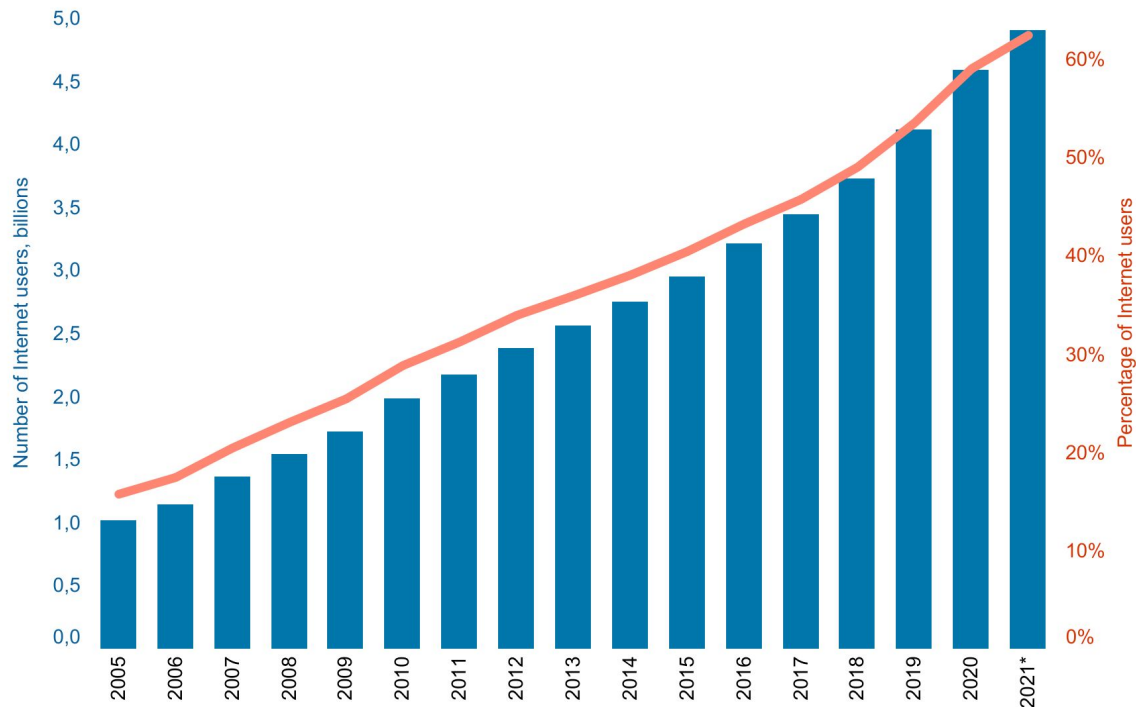
Source: ITU
* ITU estimate

Fixed Access

Fixed access not growing

3 persons per access in developed

10 persons in developing

100 persons in least developed

Source: International Telecommunication Union (via World Bank)
Note: For more details on the definition see the sources tab.

OurWorldInData.org/internet/ • CC BY

Fixed-broadband subscriptions per 100 inhabitants, by development status

Developed

World

Developing

SIDS

LLDCs
LDCs

2015   2016   2017   2018   2019   2020   2021*
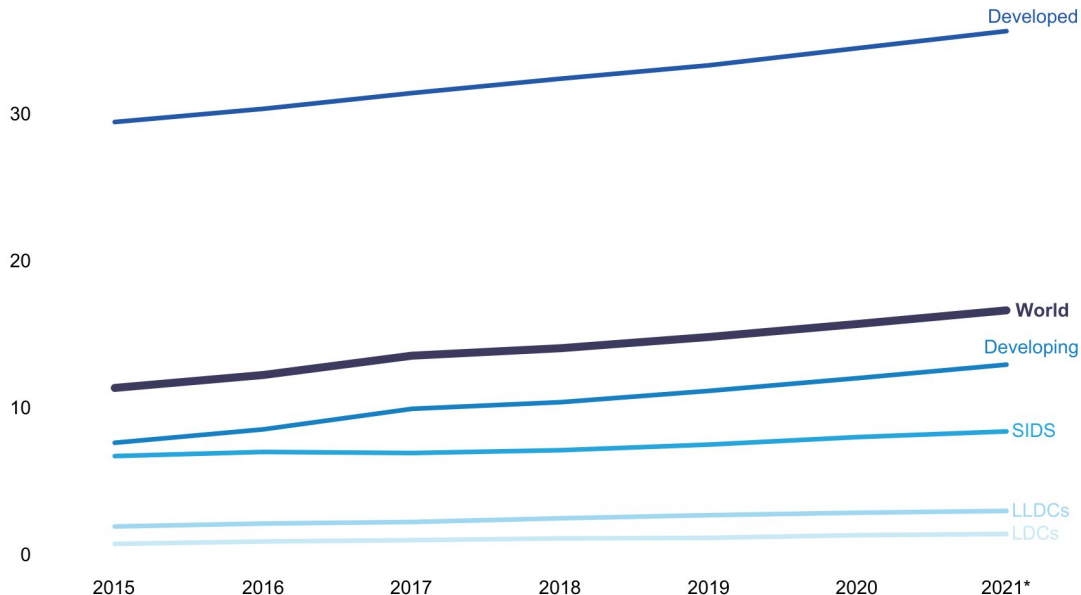
Select measure:
○ Fixed-telephone subscriptions per 100 inhabitants
● Fixed-broadband subscriptions per 100 inhabitants
○ Mobile-cellular telephone subscriptions per 100 inhabitants
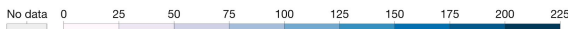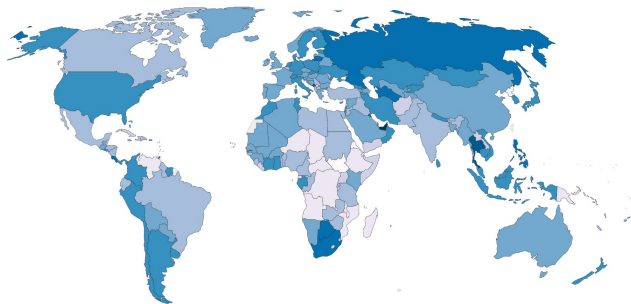○ Active mobile-broadband subscriptions per 100 inhabitants
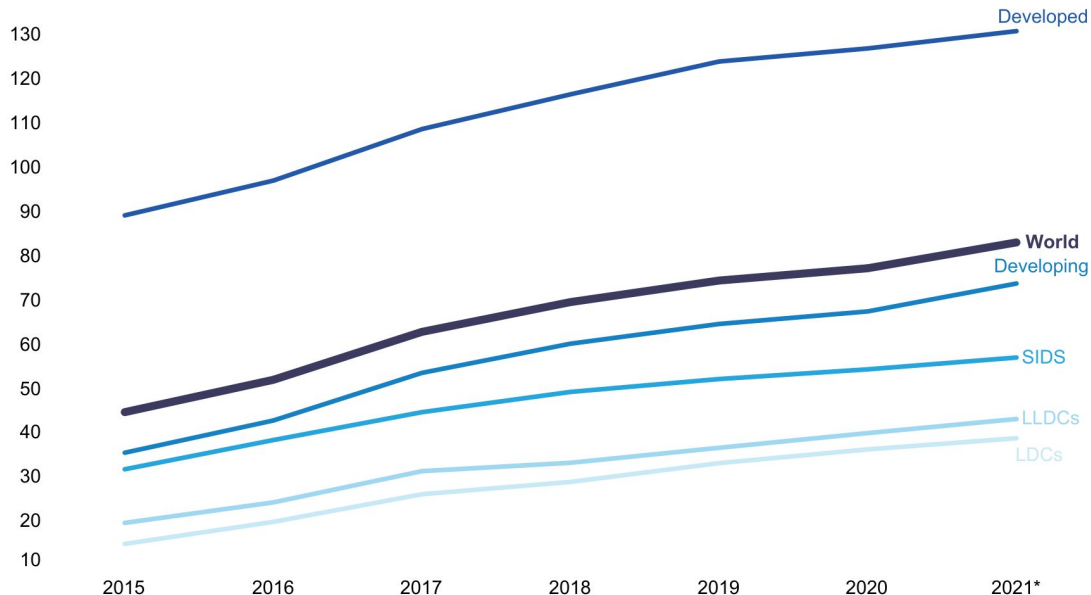
Source: ITU
* ITU estimate

Mobile Access

More than 1 mobile access per person in developed countries

About 1 mobile access every 3 persons in least developed countries

Mobile access has double in 5 years

Active mobile-broadband subscriptions per 100 inhabitants, by development status

Developed
World
Developing
SIDS
LLDCs
LDCs

Select measure:
○ Fixed-telephone subscriptions per 100 inhabitants
○ Fixed-broadband subscriptions per 100 inhabitants
○ Mobile-cellular telephone subscriptions per 100 inhabitants
● Active mobile-broadband subscriptions per 100 inhabitants

Source: ITU
* ITU estimate

2022

Internet

4.9K millions

of

People

7.9K millions

Internet Devices

Personal Devices

Non-Personal Devices

Internet Devices

Personal Devices

Non-Personal Devices

Internet Devices

Personal Devices

Non-Personal Devices

Devices connected to Internet

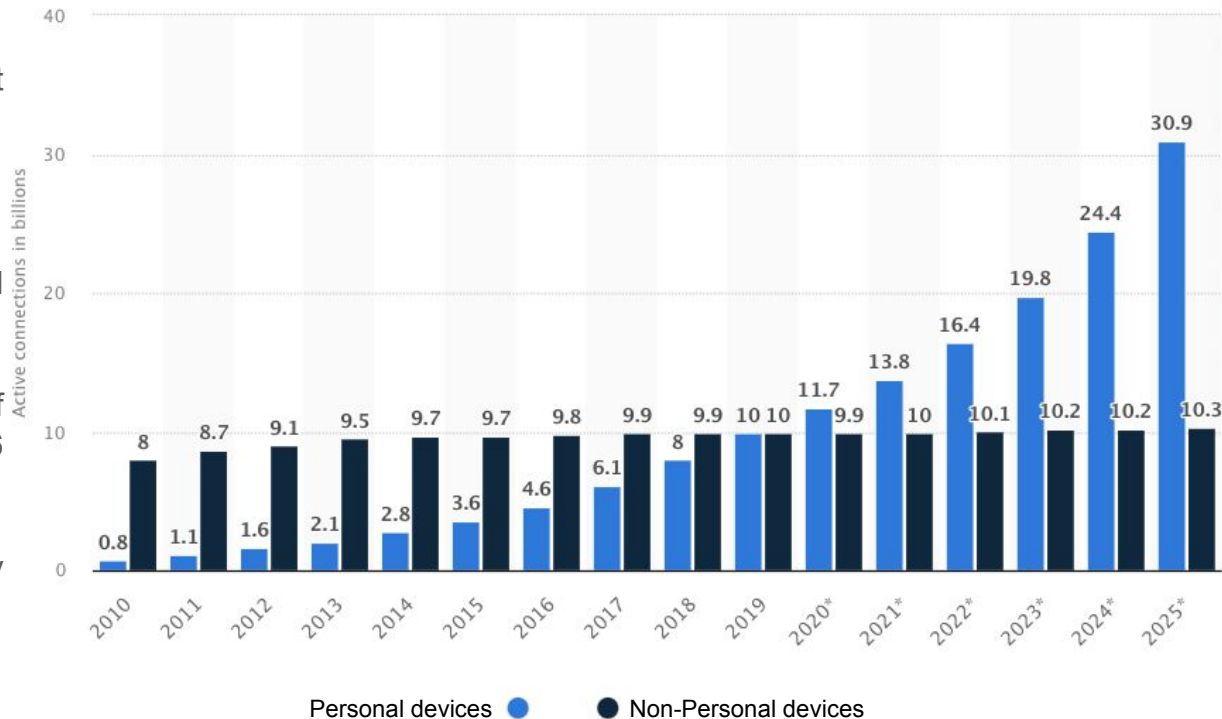2022: More non-personal devices that personal ones (~50% more)

Saturation of personal devices

Exponential growth of non-personal devices (~13% per year)

Expected more than 50K millions of non personal devices by 2030 (about 6 times world's population)

Non-personal devices can be any "Thing" connected to the Internet

Internet not only connects people but also things

Bar chart: Active connections in billions

Year	Personal devices	Non-Personal devices
2010	0.8	8
2011	1.1	8.7
2012	1.6	9.1
2013	2.1	9.5
2014	2.8	9.7
2015	3.6	9.7
2016	4.6	9.8
2017	6.1	9.9
2018	8	9.9
2019	10	10
2020*	11.7	9.9
2021*	13.8	10
2022*	16.4	10.1
2023*	19.8	10.2
2024*	24.4	10.2
2025*	30.9	10.3

Personal devices ●   Non-Personal devices ●

2022

Internet of **People**

4.9K millions   7.9K millions

Internet of **Things**

26.5K millions   16.4K millions

IoT is Every where
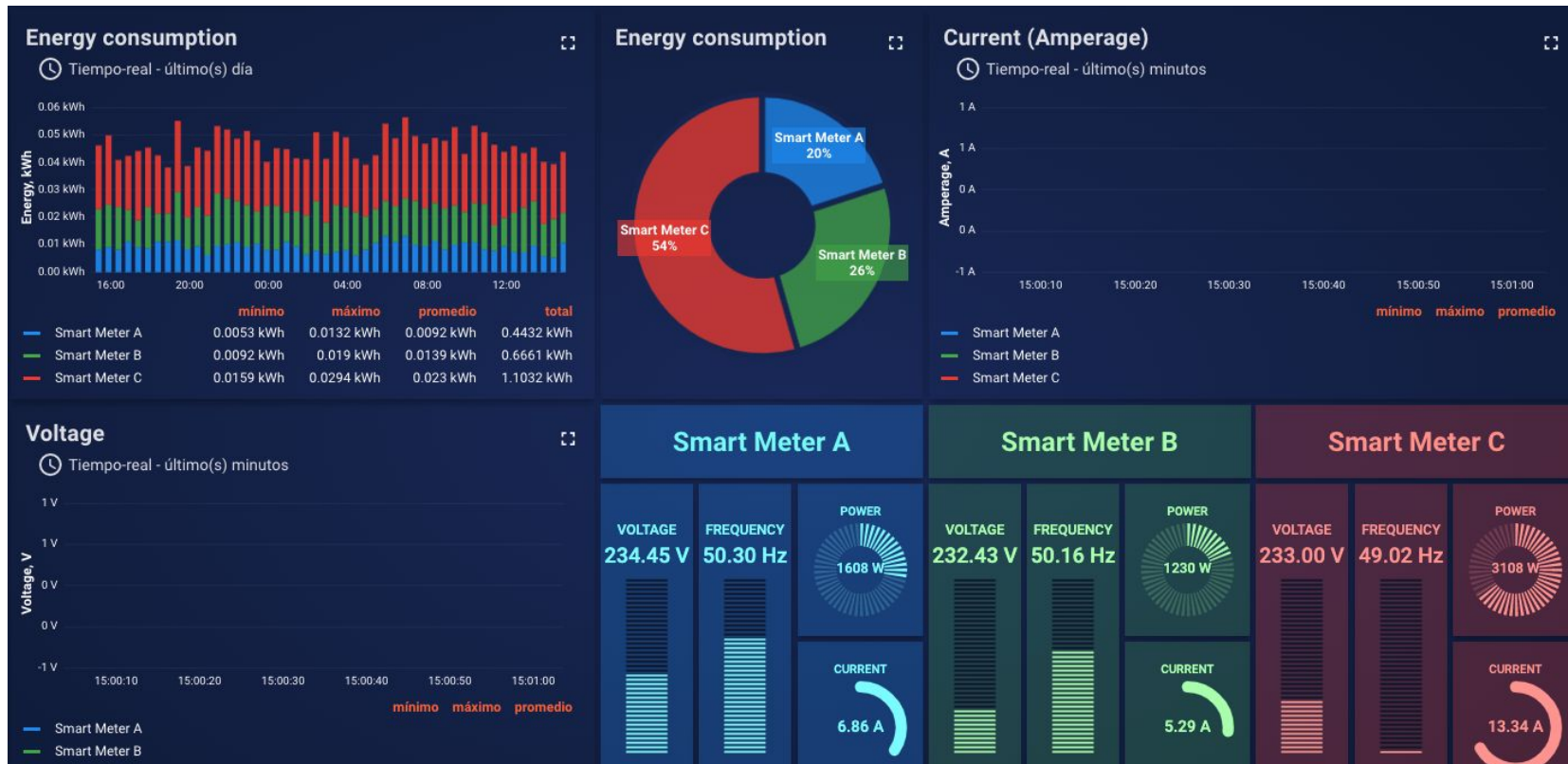
IoT in practice

IoT in practice: Smart Metering
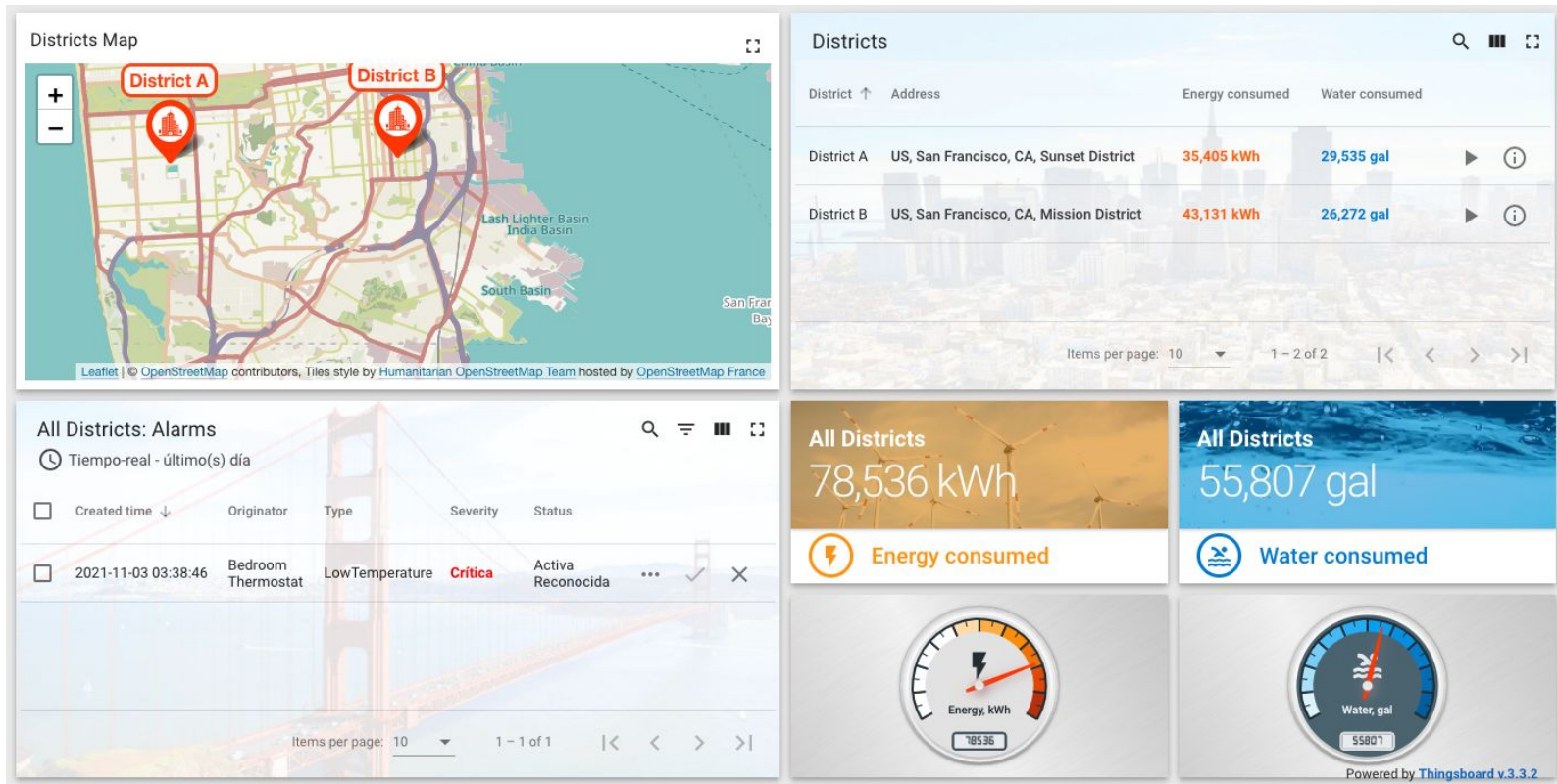
IoT in practice: Smart Energy

IoT in practice: Smart Farm
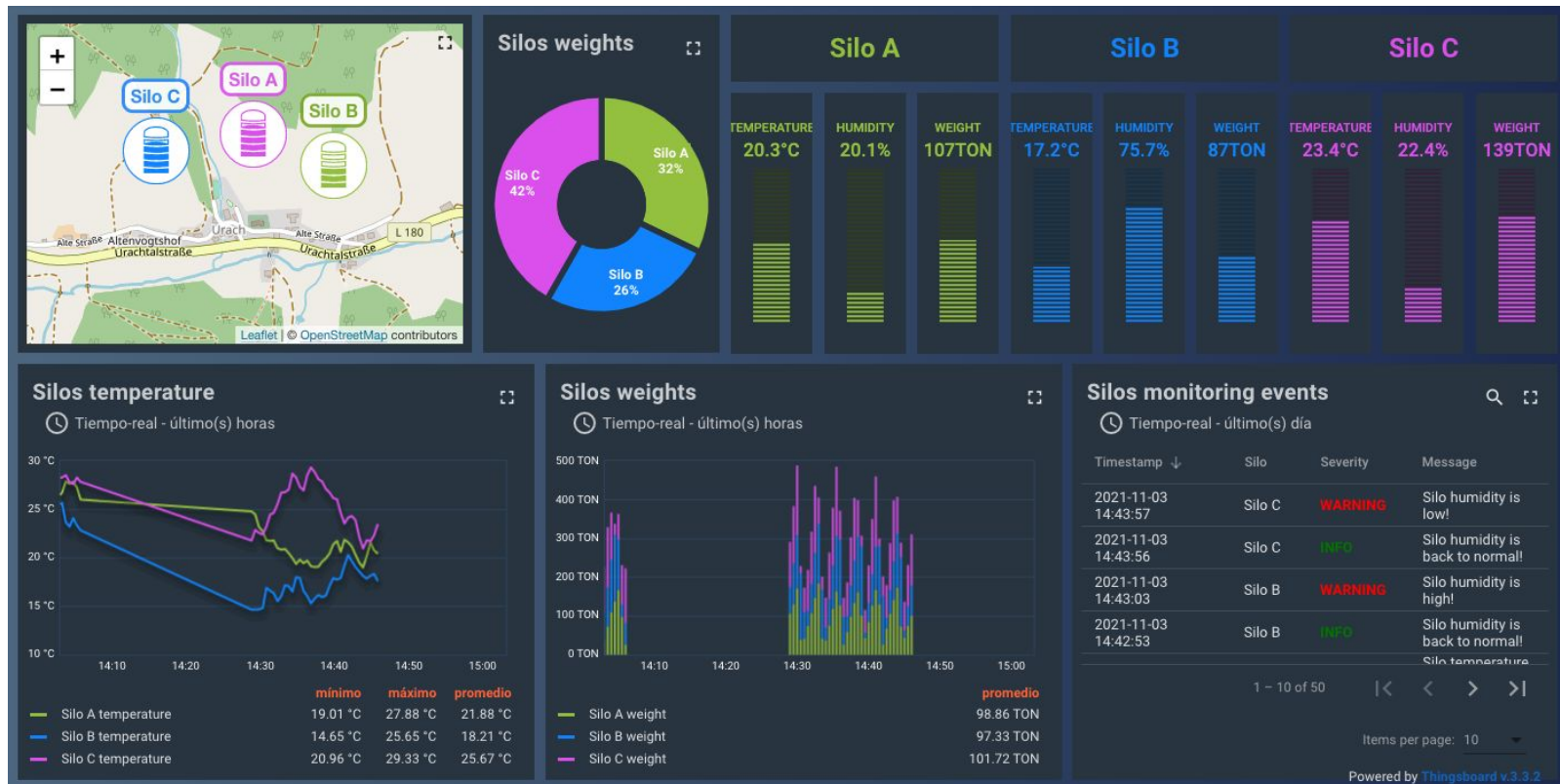
IoT in practice: Smart Fleet
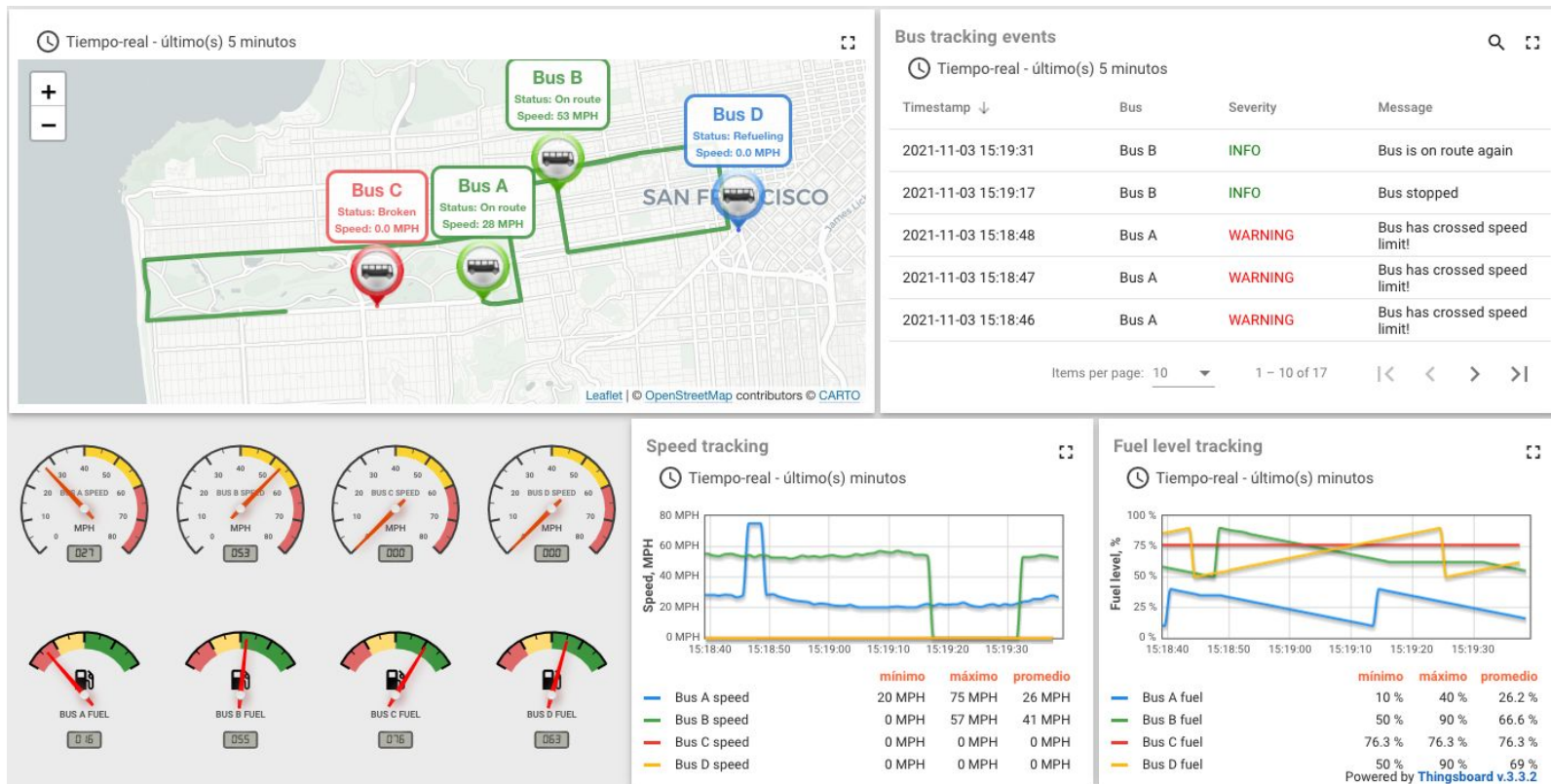
IoT Stories

Smart Building

Internet of Wine

Industry 4.0

Retail Experience

IoT Lifestyle

Smart Parking

Smart Home

Smart Factory

Manufacture like a **Bosch**

IoT for
our World

Agenda 2030

Sustainable Development Goals are a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere.

A total of 17 are proposed.

Agenda 2030: Sustainable Development Goals

IoT for Sustainable Development Project

The World Economic Forum's IoT for Sustainable Development project aims to encourage the use of the Internet of Things (IoT) to accelerate progress on the 17 United Nations Sustainable Development Goals (SDGs).
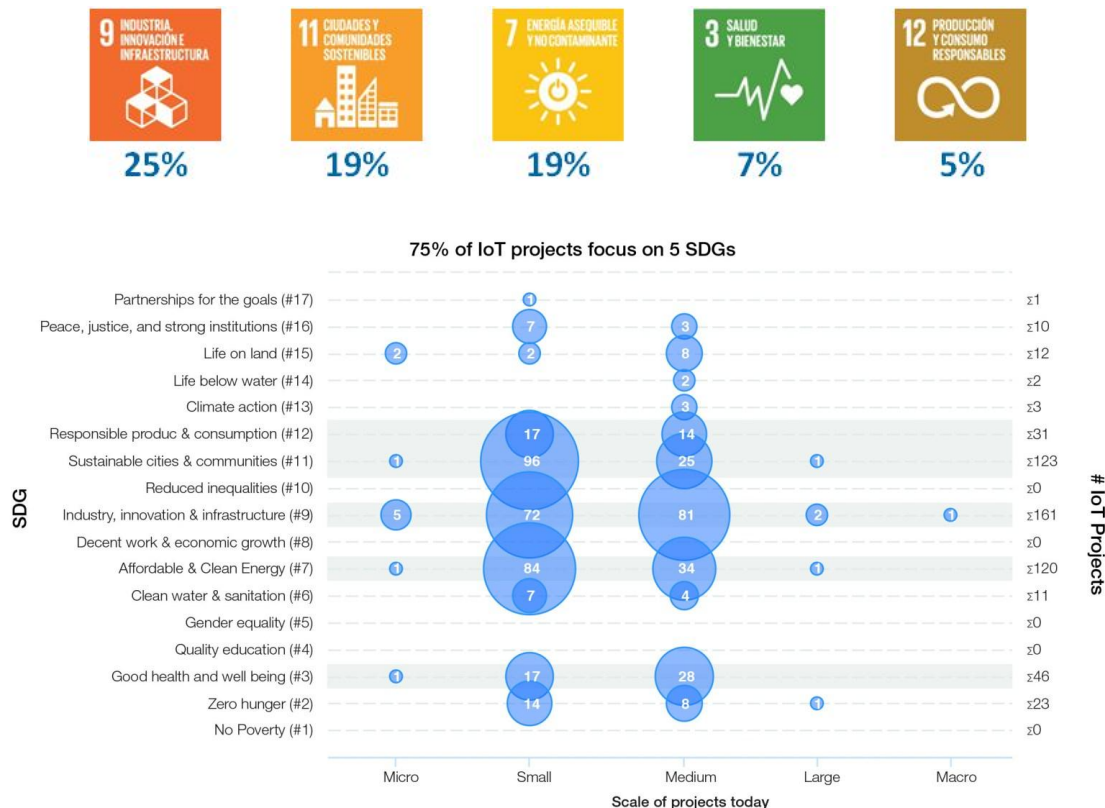
To achieve this goal, the project explores scalable and replicable models of business, investment and collaboration across industries and with public authorities to support the design of commercially viable IoT deployments that can maximize their social value potential.

More details: http://widgets.weforum.org/iot4d/

Project Results

From 640 IoT projects, 84% can contribute to achieve SDGs

Only 5 SDGs concentrate 75% of the projects

SDG icons with percentages:
- 9 INDUSTRIA, INNOVACIÓN E INFRAESTRUCTURA — 25%
- 11 CIUDADES Y COMUNIDADES SOSTENIBLES — 19%
- 7 ENERGÍA ASEQUIBLE Y NO CONTAMINANTE — 19%
- 3 SALUD Y BIENESTAR — 7%
- 12 PRODUCCIÓN Y CONSUMO RESPONSABLES — 5%

75% of IoT projects focus on 5 SDGs

SDG	Micro	Small	Medium	Large	Macro	# IoT Projects
Partnerships for the goals (#17)		1				Σ1
Peace, justice, and strong institutions (#16)		7	3			Σ10
Life on land (#15)	2	2	8			Σ12
Life below water (#14)			2			Σ2
Climate action (#13)			3			Σ3
Responsible produc & consumption (#12)		17	14			Σ31
Sustainable cities & communities (#11)	1	96	25	1		Σ123
Reduced inequalities (#10)						Σ0
Industry, innovation & infrastructure (#9)	5	72	81	2	1	Σ161
Decent work & economic growth (#8)						Σ0
Affordable & Clean Energy (#7)	1	84	34	1		Σ120
Clean water & sanitation (#6)		7	4			Σ11
Gender equality (#5)						Σ0
Quality education (#4)						Σ0
Good health and well being (#3)	1	17	28			Σ46
Zero hunger (#2)		14	8	1		Σ23
No Poverty (#1)						Σ0

Scale of projects today

But some things will never change...