MUSP
Macchine Utensili e Sistemi di Produzione

Le tendenze della tecnologia verso l'Industria 4.0

La quarta rivoluzione industriale e come tocca ognuno di noi

RETE ALTA TECNOLOGIA
EMILIA-ROMAGNA
HIGH TECHNOLOGY NETWORK

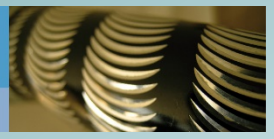
TECNOPOLO PIACENZA

Ing. Mattia Torta

5 dicembre 2017

AGRIFOOD PLATFORM

MECHANICS MATERIALS PLATFORM

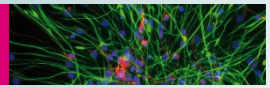


CONSTRUCTIONS PLATFORM

ICT AND DESIGN PLATFORM

ENERGY ENVIRONMENT PLATFORM

LIFE SCIENCE PLATFORM



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6 Piattaforme 91 Laboratori 10 Tecnopoli

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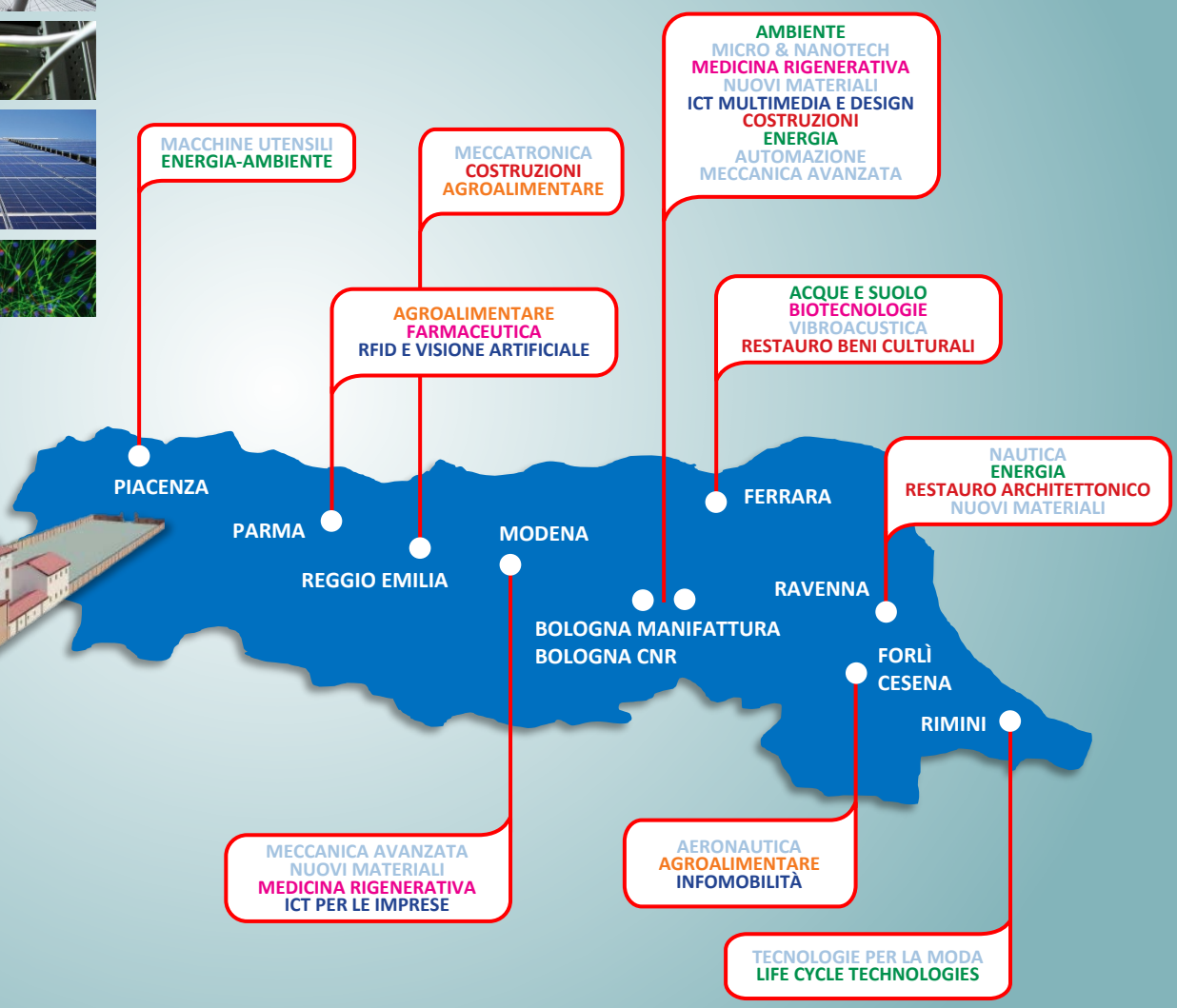

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PERCHÈ **PIACENZA?**

*Sede di alcune delle principali aziende italiane produttrici di **Centri di Lavoro a Controllo Numerico***

*Necessità di un collante tra ricerca accademica e soluzioni innovative **commercialmente rilevanti**.*

*Sede del corso di laurea in Ingegneria Meccanica del Politecnico di Milano con specializzazione in **Macchine Utensili e Sistemi di Produzione***

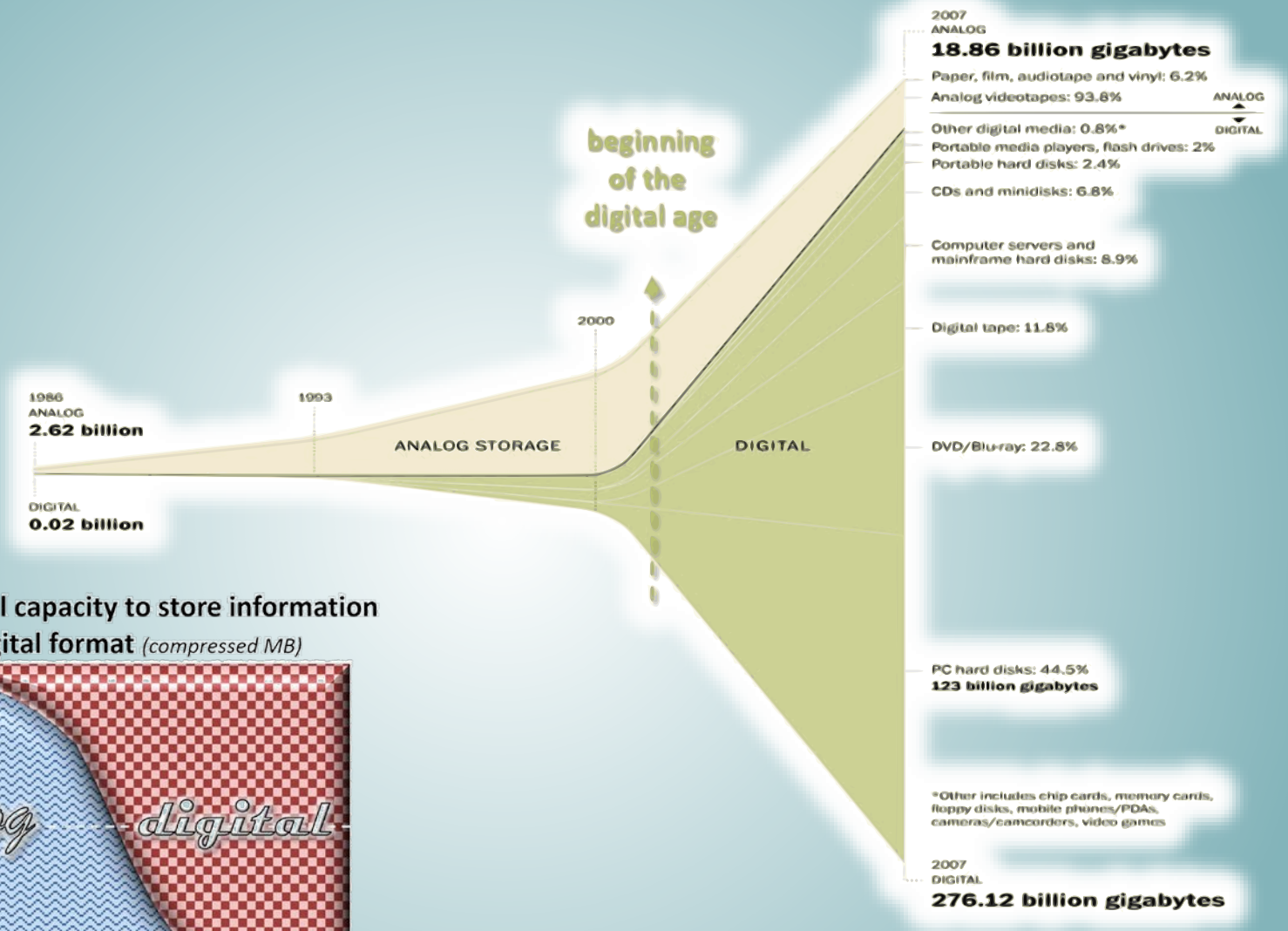
interazione
uomo-macchina

supporti di
memorizzazione

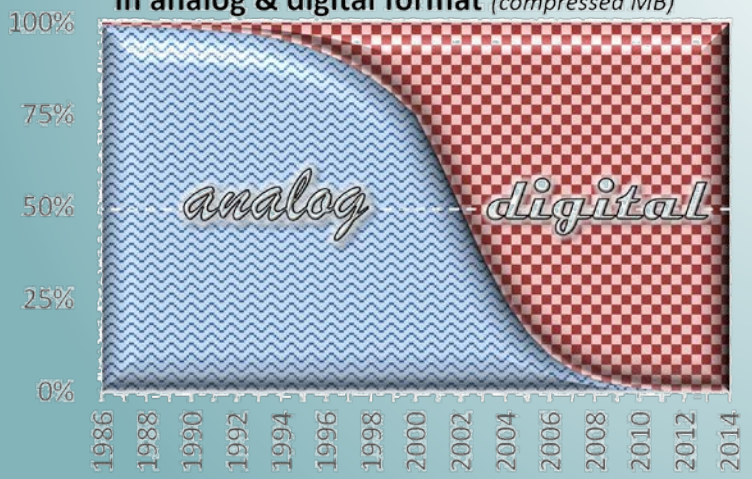
il
multimediale

la
rete

Analog to digital



World's technological capacity to store information in analog & digital format *(compressed MB)*



Road to 1 TeraByte..

1950s

1956 — 5MB

200,000 IBM 350 RAMAC Disk Files would have been required to store 1TB of data in 1956

3,151

IBM 350 RAMAC Disk File

A typical 3 minute song takes up approximately 5MB of storage space

The 1st disk drive introduced by IBM, and was the size of a large wardrobe

$35,000 year to lease

1 Tonne Weight

24" Disk

Consisted of 50 24 inch discs with a total capacity of 5MB

1960s

1961 — 28MB

35,714 IBM 1301 Disk Storage Units would have been required to store 1TB of data in 1961

160 Tonne

IBM 1301 Disk Storage Unit

Was first used in the SABRE airline reservation system with only 348MB

$2,100 per month

$115,500

10 pounds Weight

24" Disk

Each module had 25 disks and could store 28 MB per module. Up to 10 modules could be added to a computer for a maximum of 280 MB

1970s

$1,850

$87,700

14" Disk

IBM 3330 Subsystem

1970 — 100MB

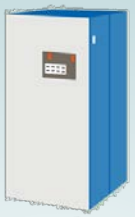
6,250 IBM 3330 Disk Packs would have been required to store 1TB of data in 1970

1980s

1980 — 2.52GB

397 DASDs would have been required to store 1TB of data in 1980

To store 1 Terabyte of data, you would need only 397 DASDs each the size of a 250 kg refrigerator, totaling a whopping 99 tons!



IBM 3380 Direct Access Storage Device (DASD)

With the introduction of a new film head technology, a stored up to 2.52GB, almost four times the amount of previous IBM storage devices

The World's first gigabyte Hard Drive was the size of an average refrigerator

$2,170 per month

$81,000

550 Pounds Weight (250 kg)

14" Disk

1990s

1991 — 20MB 40MB

25,000 Integral Mustang 1842 Disk Drives would have been required to store 1TB of data in 1991

Integral Peripherals Mustang 1820 & 1842

Integral's the Mustang 1820 & 1842 drives were designed to be used with next generation of portable computers including subnotebook, pen and palmtop systems

The World's first 1.8 inch HDD

Used one 1.8 inch platter to store 20MB - the 1842 model stored 20MB on both platters, giving it a capacity of 40MB

1.8" Disk

2000s

12 Gram Weight

$54.99

Trek ThumbDrive

2000 — 8MB-256MB

3,906 Trek ThumbDrives would have been required to store 1TB of data in 2000

TODAY

2012 SEP — 10TB

The hard drive is helium filled, rather than air filled

Western Digital Ultrastar He10

Being a thinner gas, helium drives use less power and run at four to five degrees cooler than today's 7200rpm drives

World's first 4 TB HDD 3.5 inch hard disk drive

Manufactured by Western Digital

A 1TB USB Flash Drive

$1,145

Fits on a keyring and can double as a keyholder

DataTraveler HyperX Predator USB Flash Drive

1TB Capacity — 2013 JAN Year Released

A 1TB USB Flash Drive

2014 SEP — 512MB

Only 2 of these SD Cards are needed to store a Terabyte of data!

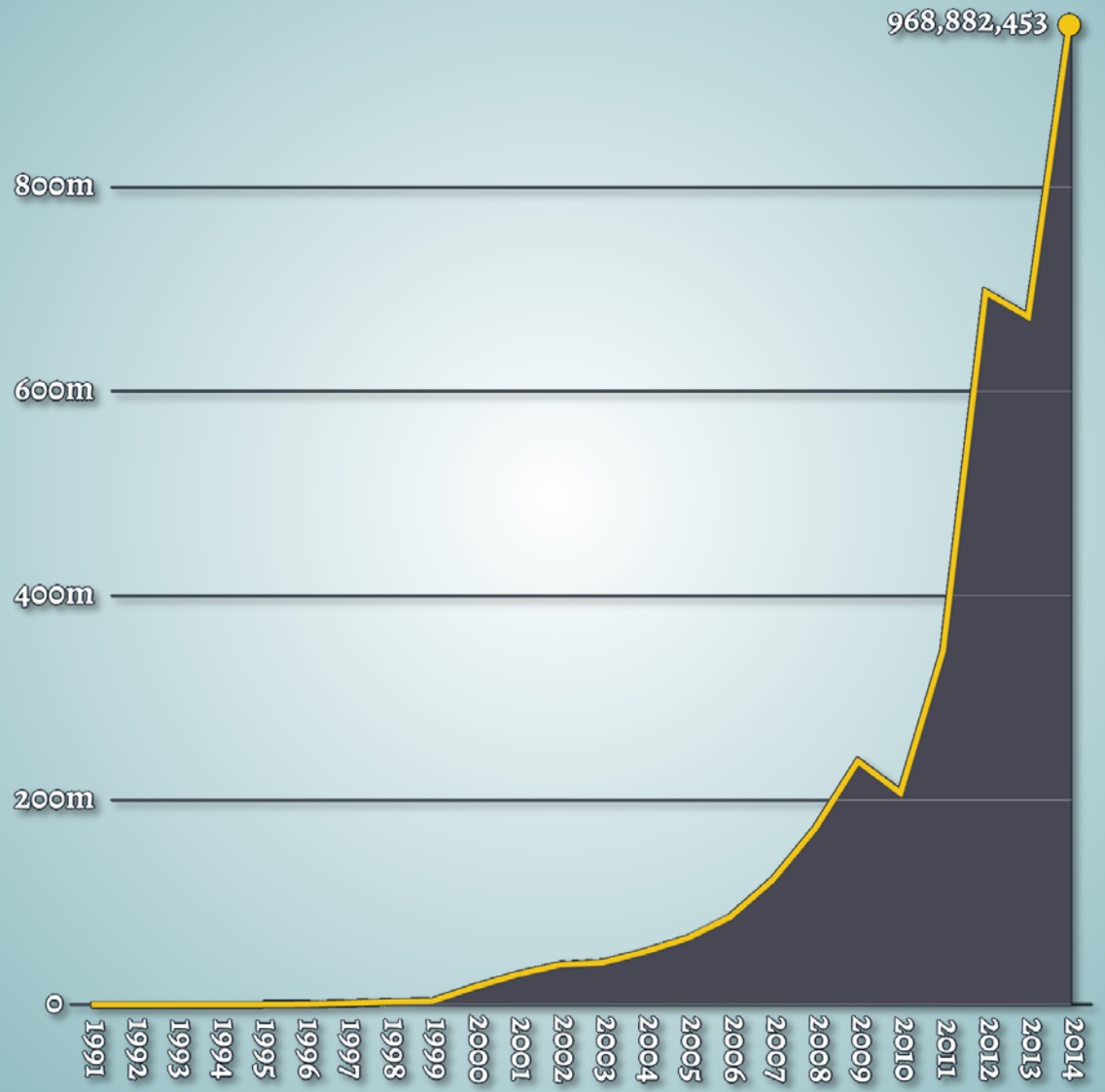
SanDisk Extreme PRO® SDHC™/SDXC™ UHS-I Memory Card

512MB SD Memory Card

$279

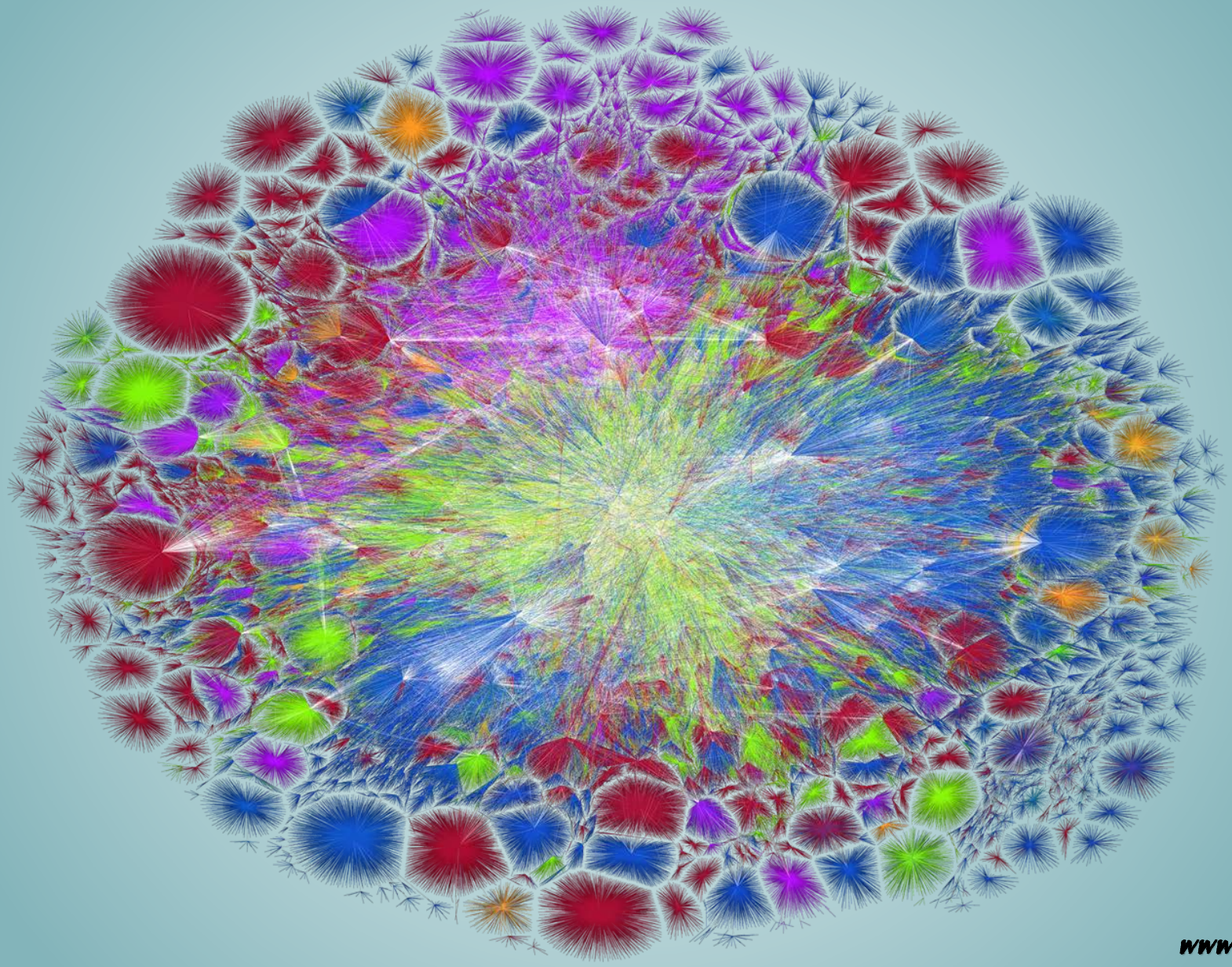
Courtesy of 7dayshop.com

Quante pagine web?



dadaviz.com

La rete



www.opte.org

www.musp.it

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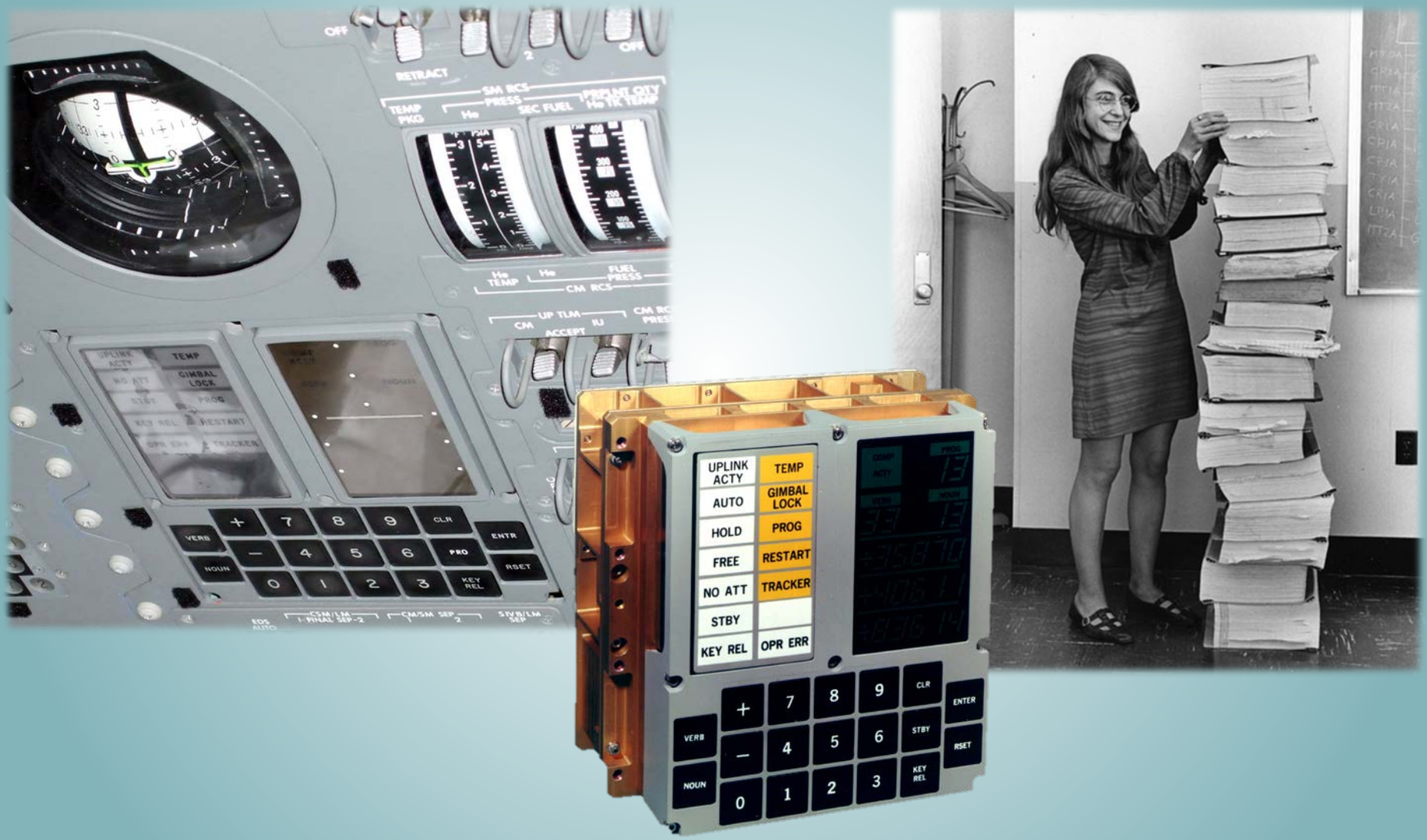
Rete e Supporti multimediali

gkofiannan.com

Capacita di calcolo



Capacita di calcolo

Apollo Gvidance Compvter
CPU: 2MHz
RAM-ROM: 152 kB

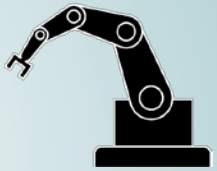
iPhone 6s
CPU: Dval-Core 1800 MHz
RAM: 2.000.000 kB

4.0: Rivoluzione?

Prima
Motori a vapore permettono una industrializzazione centralizzata.

Seconda
Mass production grazie a elettricità e le linee di produzione.

Terza
Sistemi informatici permettono una ulteriore automazione.



1800

1900

2000

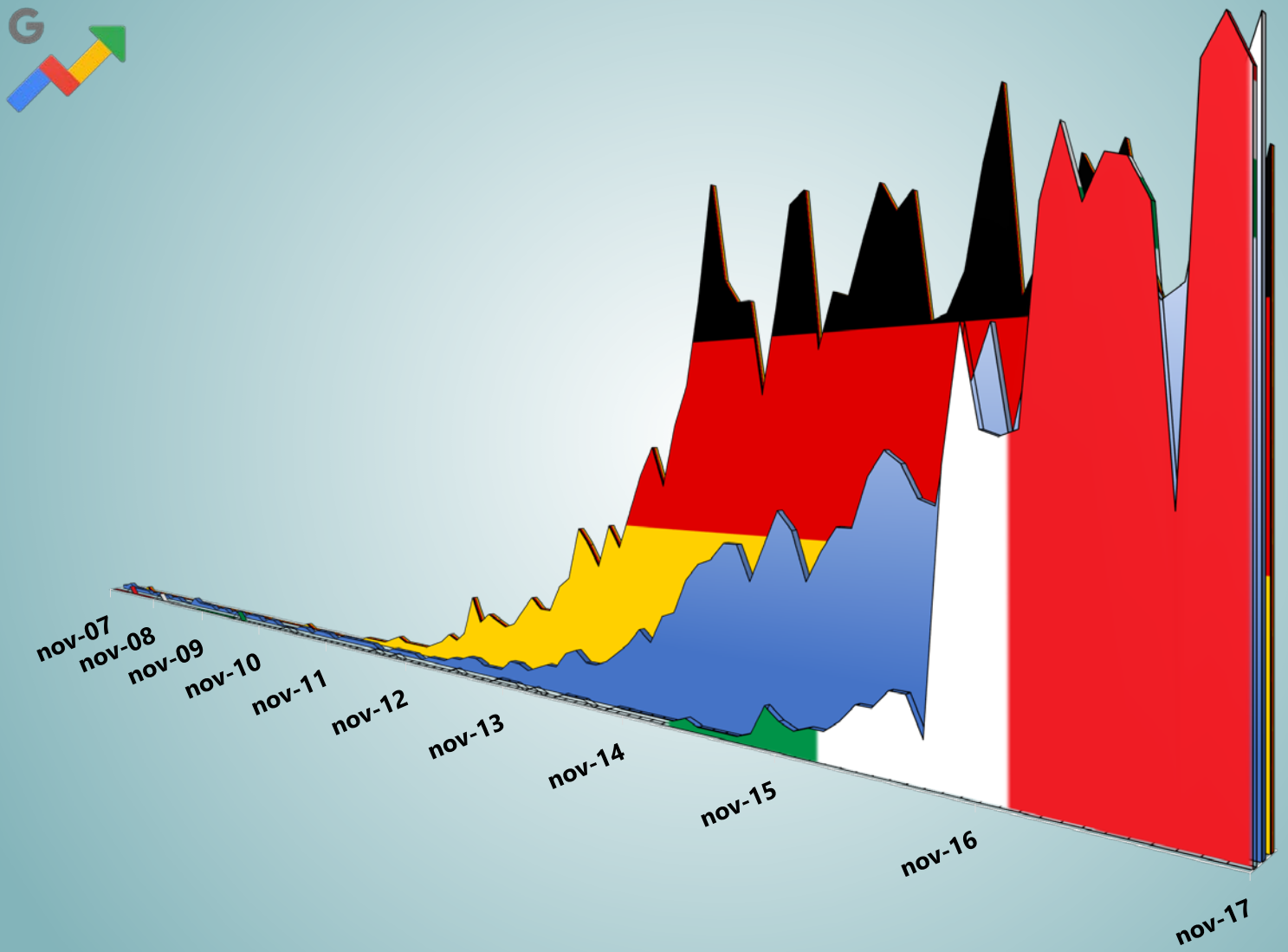
1784: Primo telaio meccanico

1870: Prima linea di assemblaggio

1969: Primo controllore programmabile

Oggi

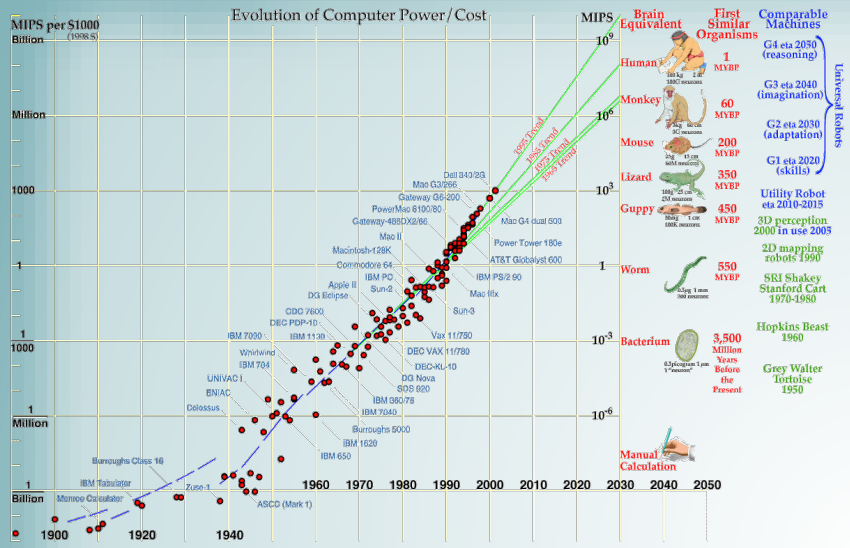
La Germania per prima, il resto del mondo poi

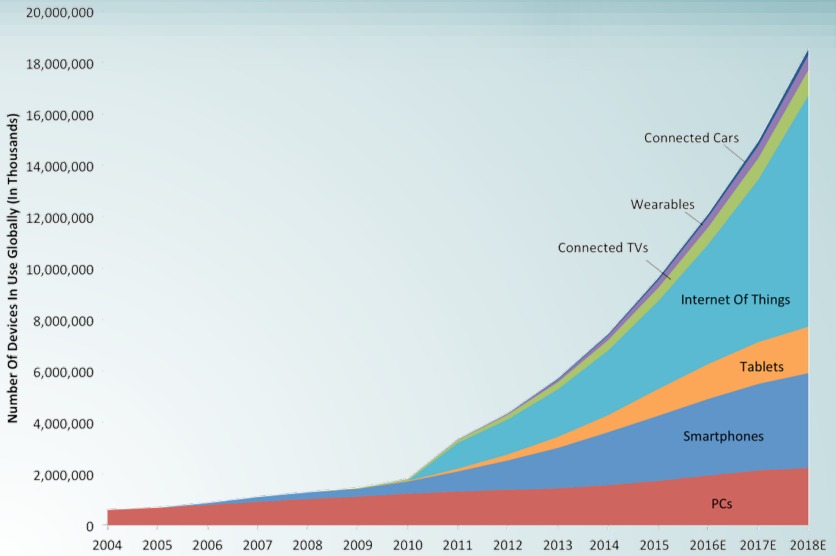


Le tecnologie di industria 4.0

BostonConsultingGroup

Internet del tutto, cloud e sistemi cyber fisici





Dr. James Truchard
CEO, president and cofounder of National Instruments

- *CPS as* computer-based systems that exhibit a deeply integrated, real-time interaction between computer and physical components -

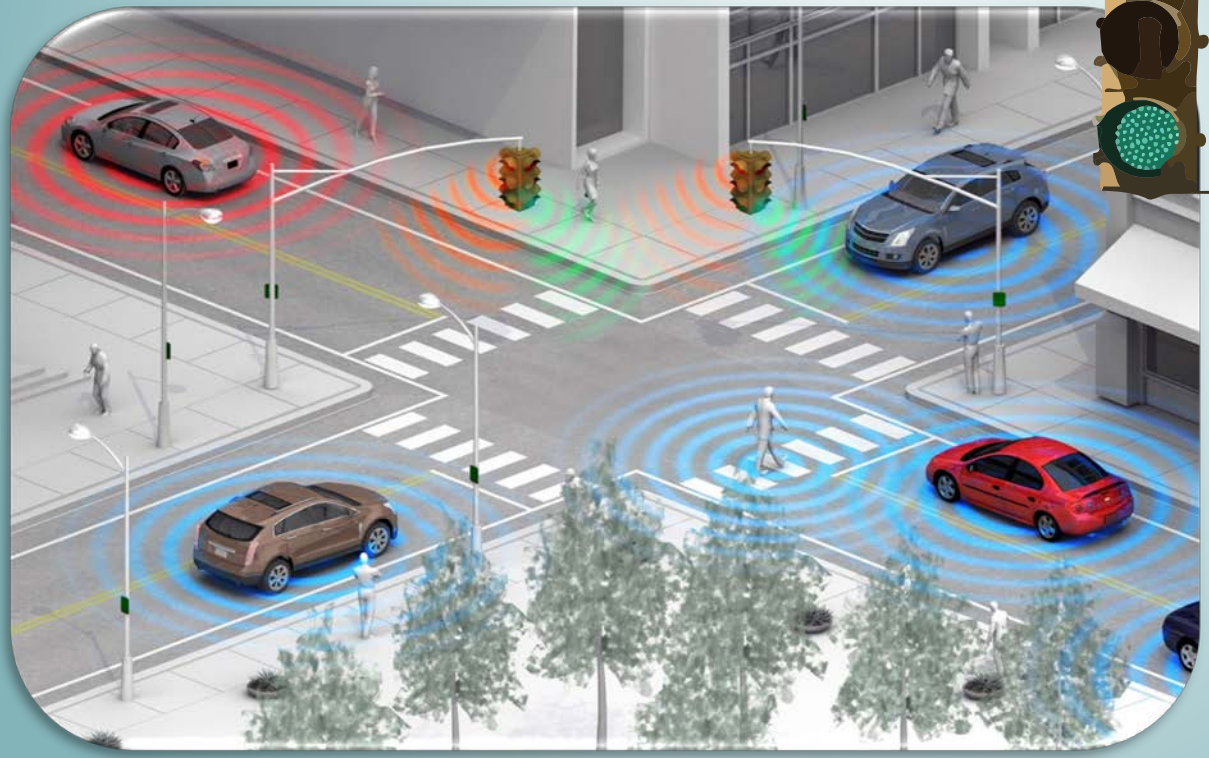
Sistemi cyber fisici

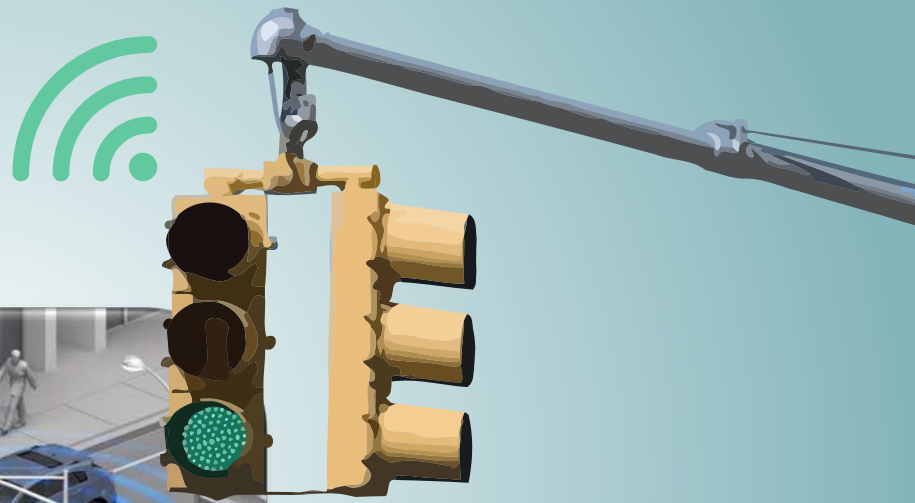
Cloud

Physical
Objects

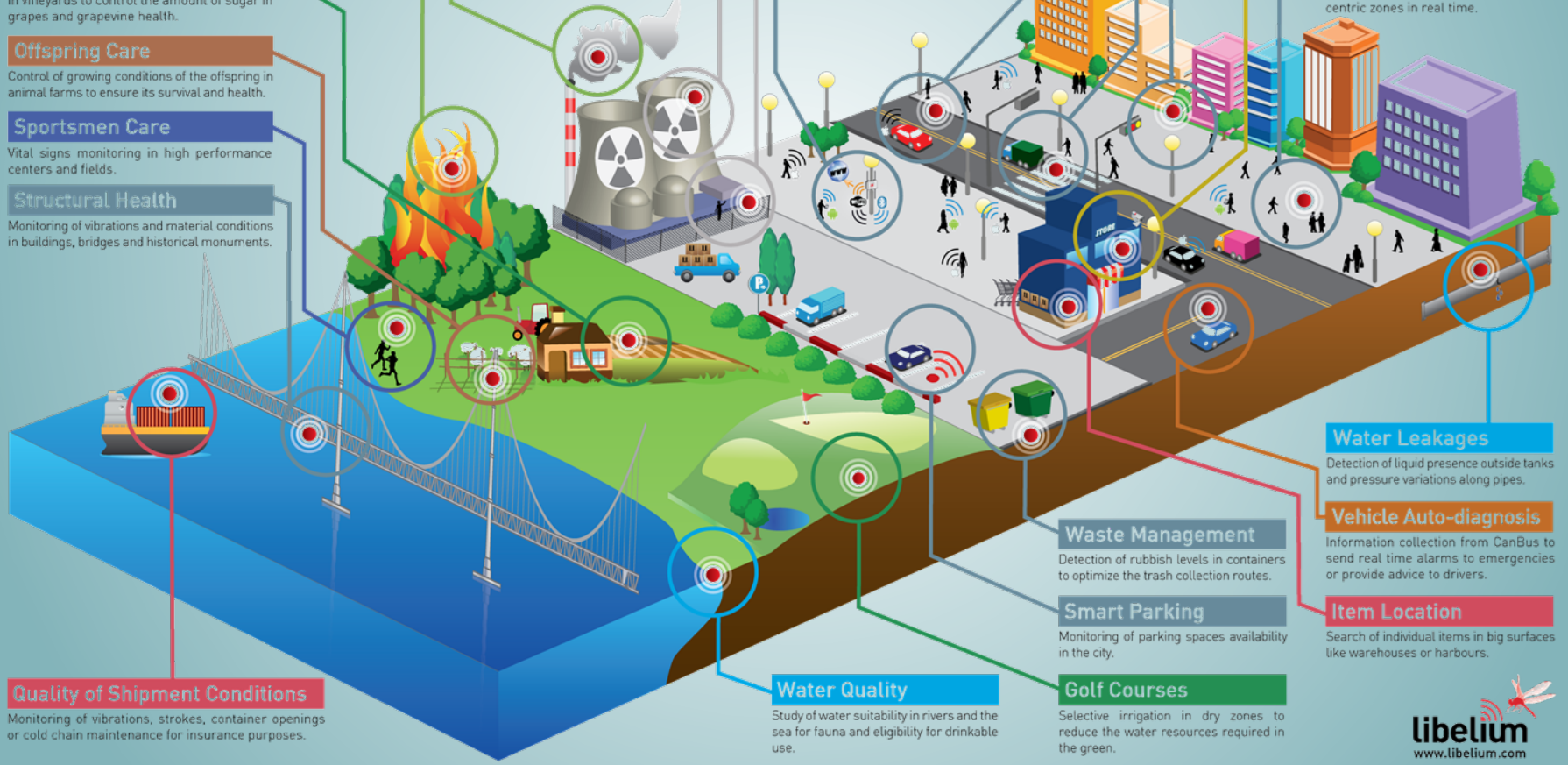
Un semplice esempio

waze
OUTSMARTING TRAFFIC, TOGETHER





Libelium Smart World



Air Pollution
Control of CO_2 emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection
Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing
Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care
Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care
Vital signs monitoring in high performance centers and fields.

Structural Health
Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Quality of Shipment Conditions
Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Smartphones Detection
Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

Perimeter Access Control
Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels
Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels
Measurement of the energy radiated by cell stations and WiFi routers.

Traffic Congestion
Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Smart Roads
Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting
Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping
Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Noise Urban Maps
Sound monitoring in bar areas and centric zones in real time.

Water Leakages
Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis
Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location
Search of individual items in big surfaces like warehouses or harbours.

Waste Management
Detection of rubbish levels in containers to optimize the trash collection routes.

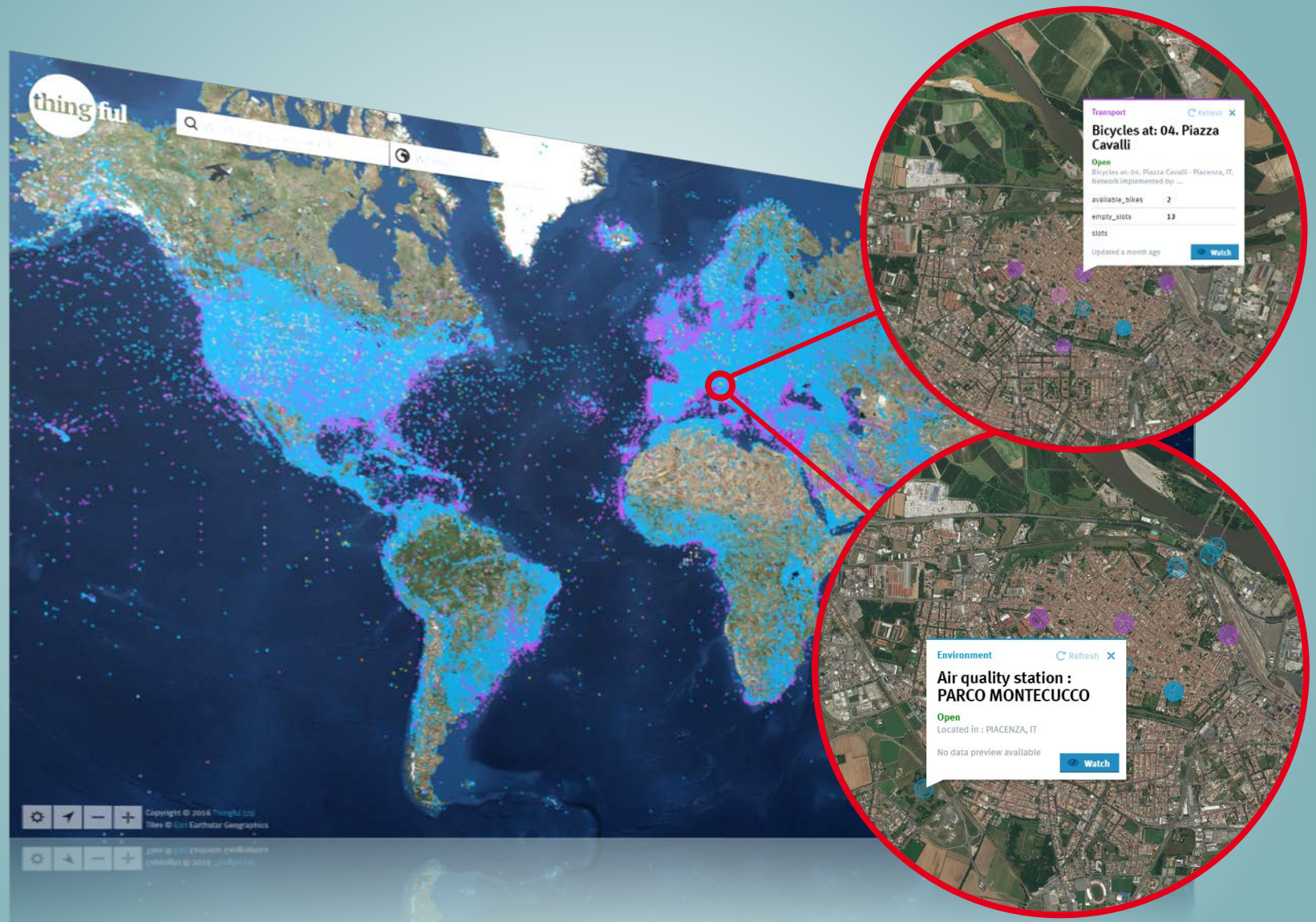
Smart Parking
Monitoring of parking spaces availability in the city.

Water Quality
Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.

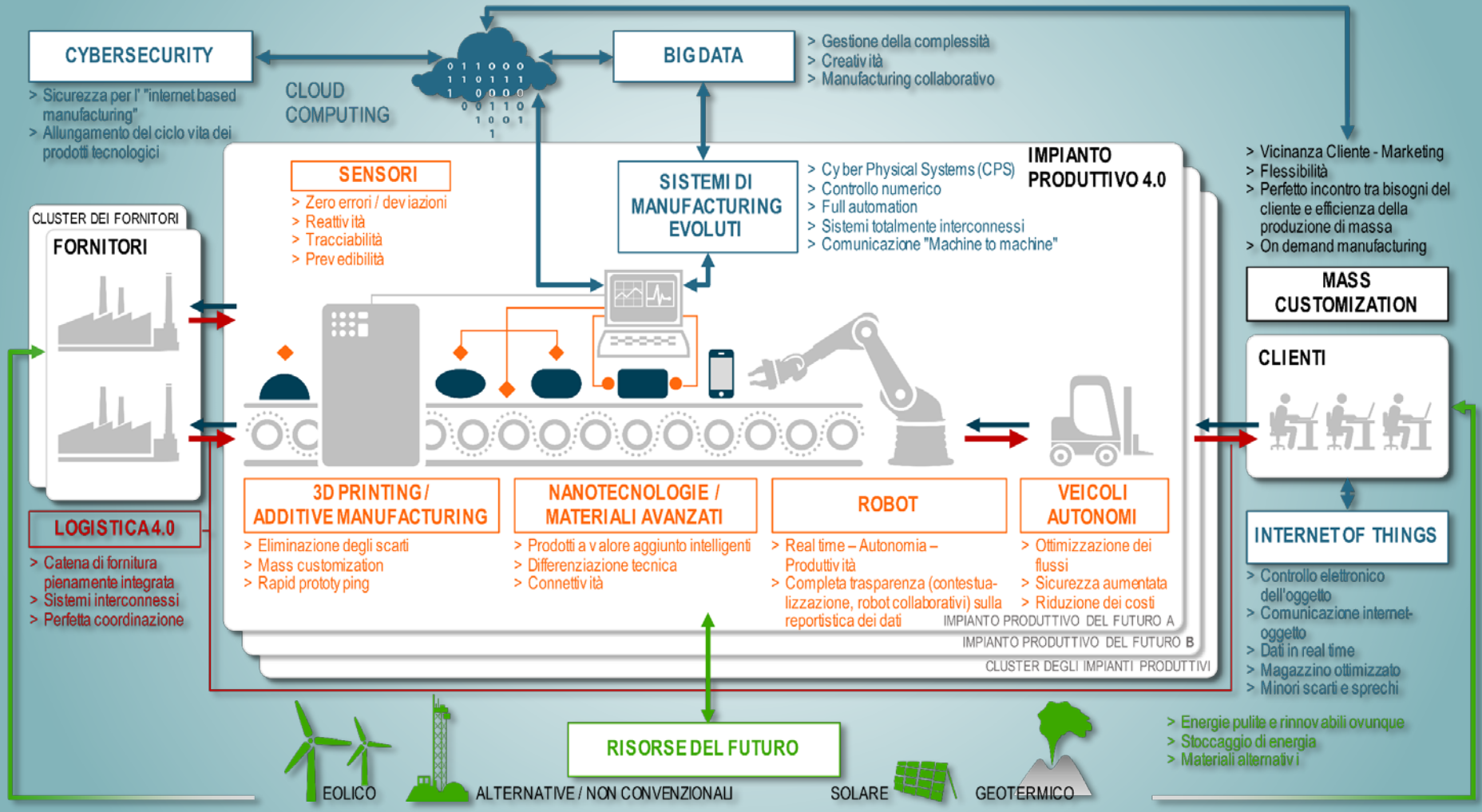
Golf Courses
Selective irrigation in dry zones to reduce the water resources required in the green.

libelium
www.libelium.com

Un mondo smart

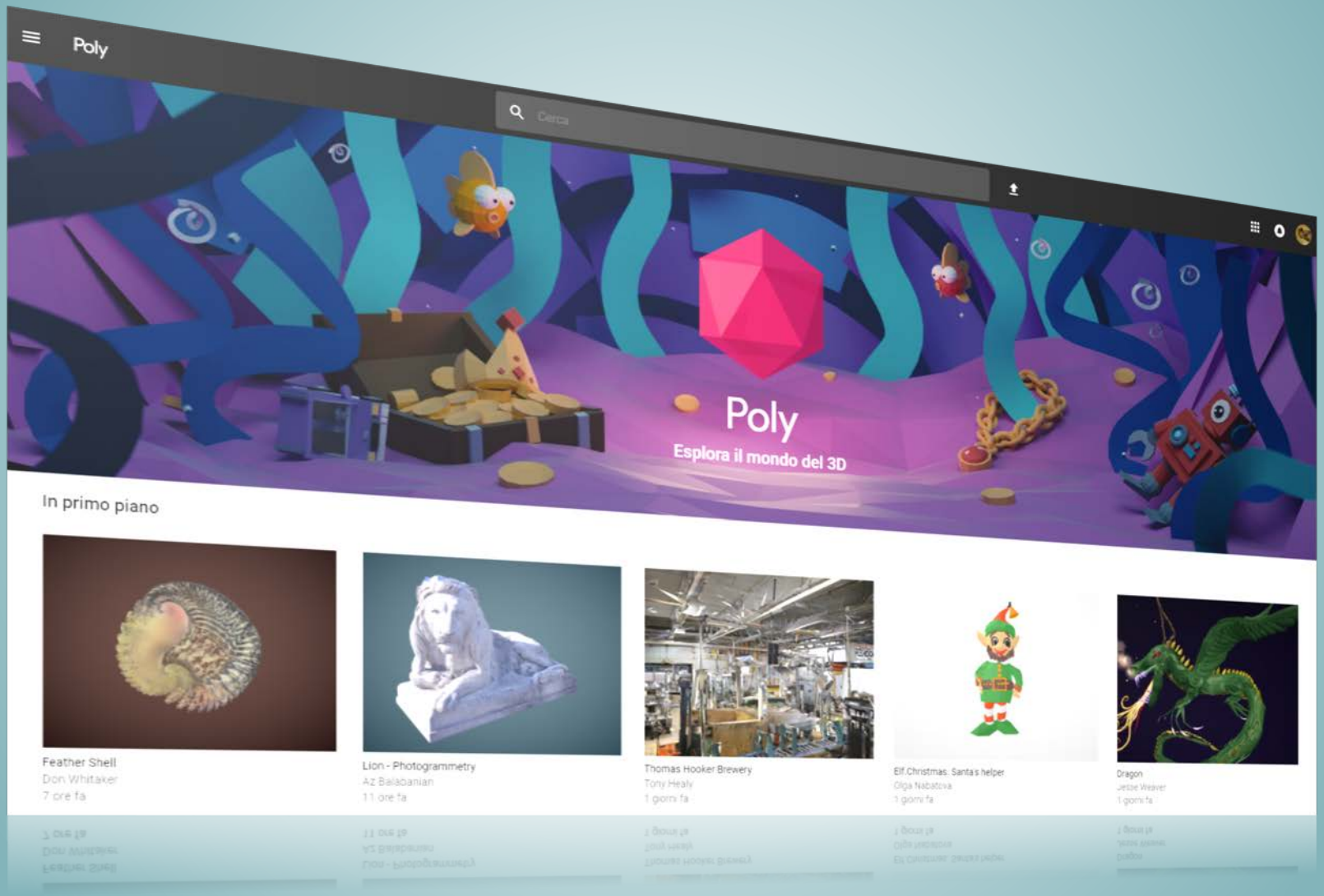


Sistema di produzione cyber fisico



Non solo IoT e CPS

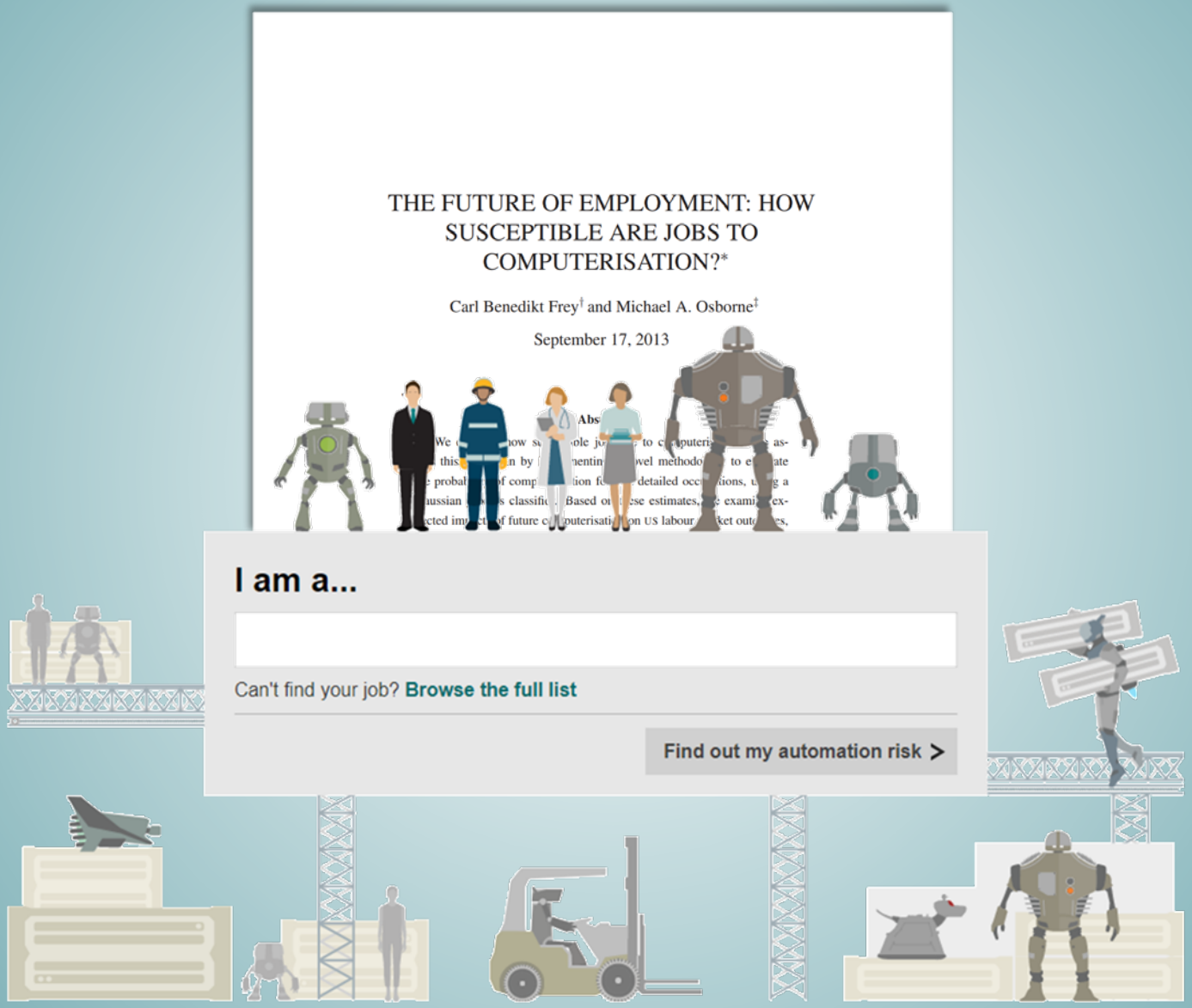
Non solo IoT e CPS



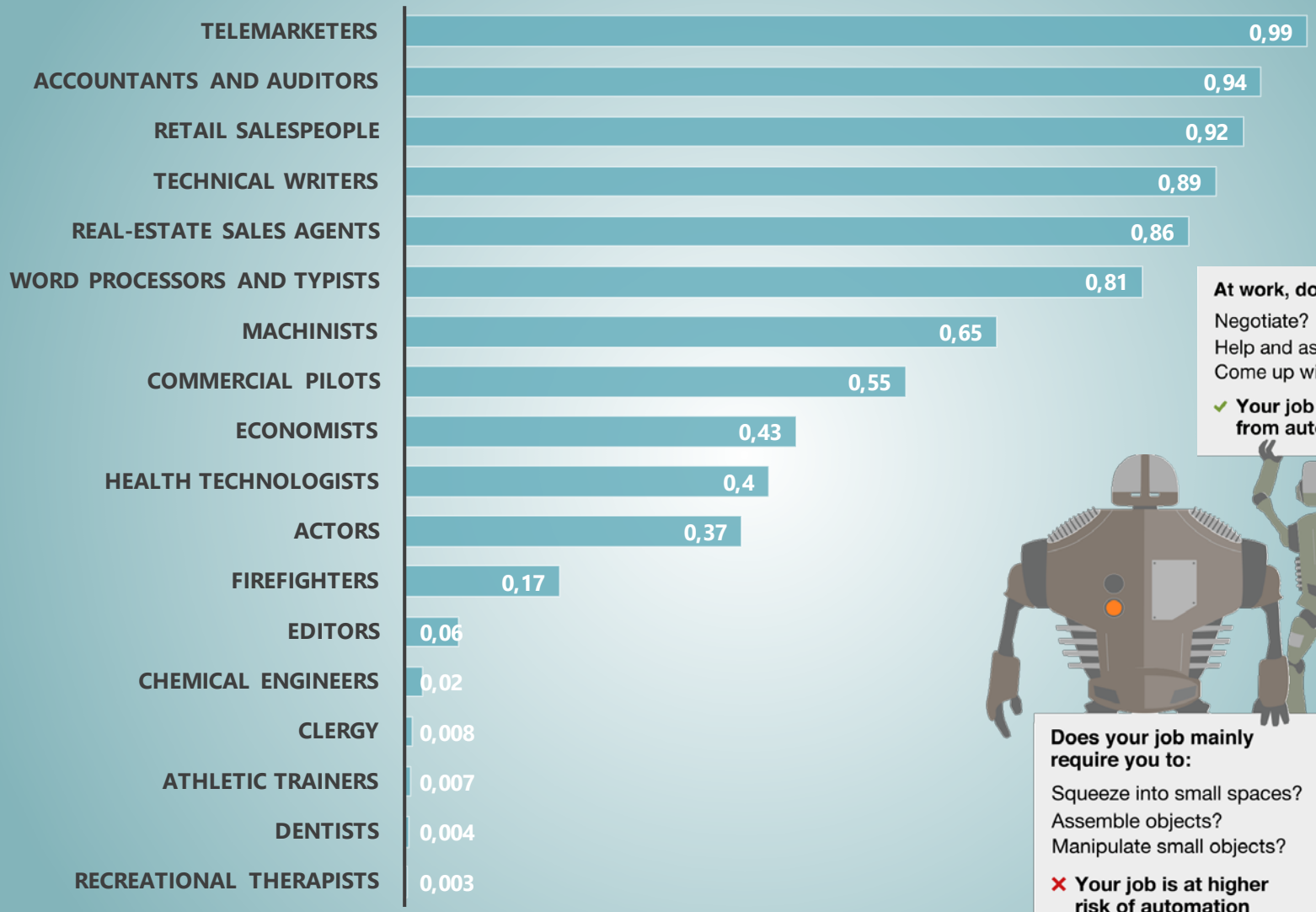

Don't forget
to buy milk!

Ma il lavoro?

Ma il lavoro?


THE FUTURE OF EMPLOYMENT: HOW SUSCEPTIBLE ARE JOBS TO COMPUTERISATION?*
Carl Benedikt Frey† and Michael A. Osborne‡
September 17, 2013
I am a...
Can't find your job? Browse the full list
Find out my automation risk >

Chance of automation



At work, do you need to:

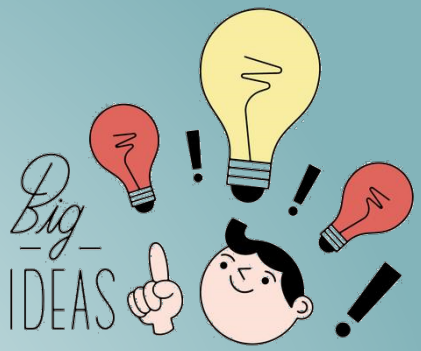
Negotiate?
Help and assist others?
Come up with original ideas?

✓ **Your job is safer from automation**

Does your job mainly require you to:

Squeeze into small spaces?
Assemble objects?
Manipulate small objects?

✕ **Your job is at higher risk of automation**



sabato, novembre 18, 2017

INDUSTRIE QUATTROPUNTOZERO

SCENARI | TECNOLOGIE 4.0 | SISTEMI DI PRODUZIONE | 4.0 IN PRATICA | GESTIONE | INCENTIVI E AGEVOLAZIONI | RICERCA

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Monitoraggio in tempo reale per la fabbrica intelligente
Redazione - 17 novembre 2017

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Industrial Internet of Things: un mercato multimiliardario

INCENTIVI E AGEVOLAZIONI
Alternanza scuola lavoro nel segno dell'Industria 4.0

SCENARI
Gli imprenditori promuovono il Piano nazionale Industria 4.

INDUSTRIE 4.0

Soluzioni per l'industria 4.0
METRONOMO
Il giusto mix di elementi

Controllo remoto
Sensoring
Monitoraggio produzione
Revamping 4.0
Manutenzione predittiva
Cloud cyber security
Ecomonitor
System integrator 4.0
Dispositivi mobili
Certificazioni 4.0
Big Data Analytics

In questo scenario iper-tecnologico, all'vomo resta il compito essenziale di portare creatività, governare le tecnologie, progettare i sistemi, controllare e migliorare i processi prodvttivi e di conseguenza anche i prodotti e i servizi.

Satoshi Kuroiwa
Toyota

MUSP

Macchine Utensili e Sistemi di Produzione

Grazie per l'attenzione

Ing. Mattia Torta - mattia.torta@musp.net

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HIGH TECHNOLOGY NETWORK

TECNOPOLO PIACENZA

5 dicembre 2017