INTERNET OF THINGS

Politeknik Elektronika Negeri Surabaya (PENS)

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Chapter 1

What is Internet of Things ?

definition

“a concept that aims to extend the benefits of Internet connectivity, for objects in the physical world communication.”

GudangLinux.com

“the network of physical objects accessed through the Internet, as defined by technology analysts and visionaries”

sco.com/web/solutions/trends/iot/overview.html

“the interconnection of uniquely identifiable embedded computing devices within the existing Internet infrastructure”

Wikipedia.com/wiki/Internet_of_Things

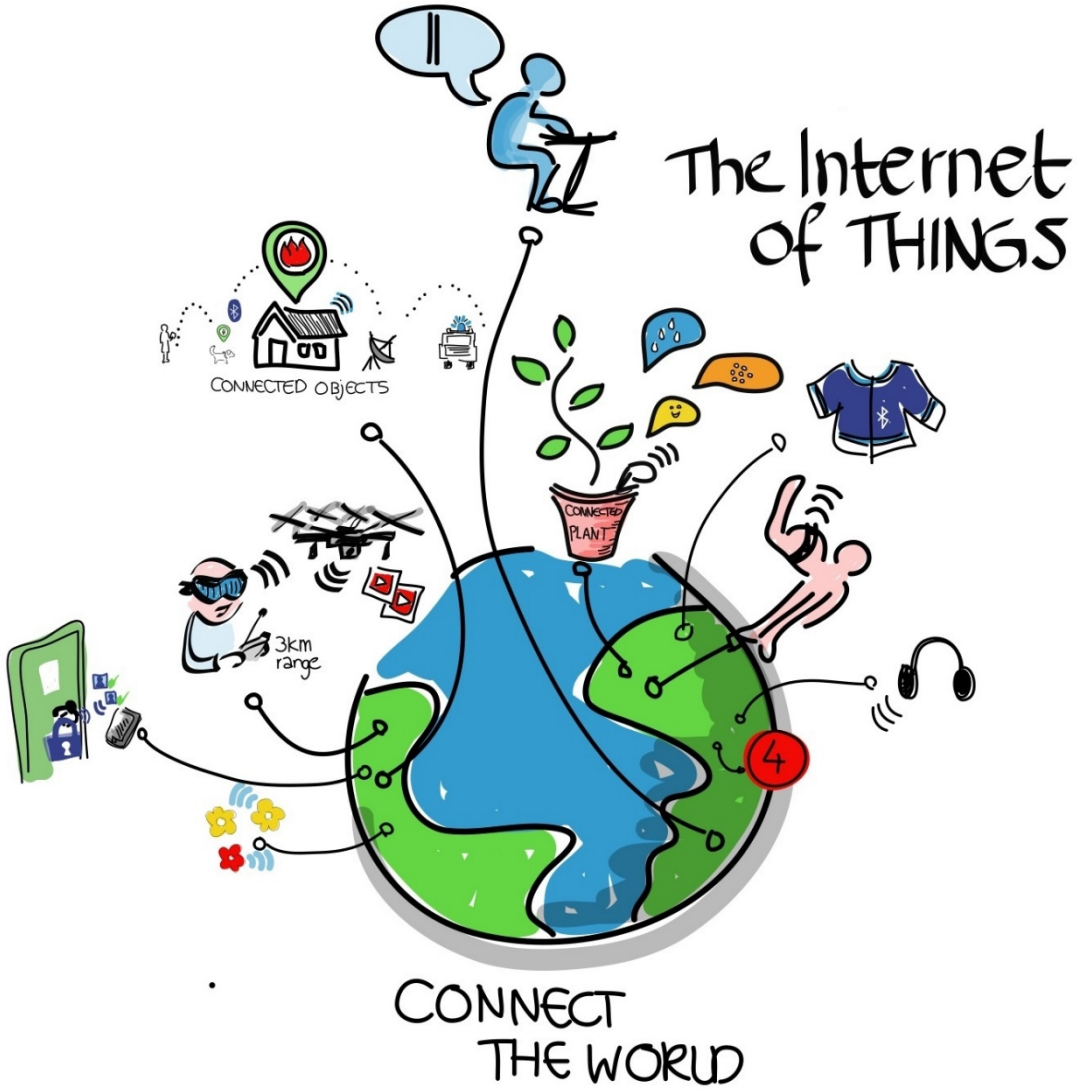
dɛfɪˈnɪʃ(ə)n

IoT
(Internet of Things)

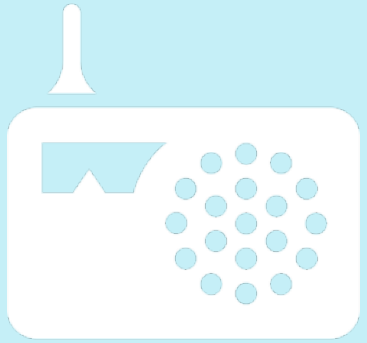
Casagras
(Coordination and support action for global RFID-related activities and standardisation)

M2M
(Machine to Machine)

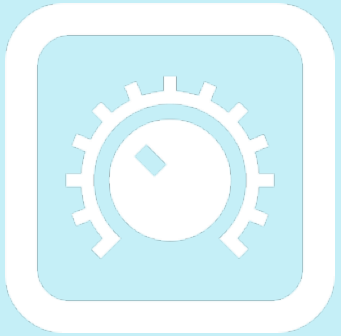
SAP
(Systeme, Anwendungen und Produkte)



Resource : http://upload.wikimedia.org/wikipedia/commons/a/ab/Internet_of_Things.jpg

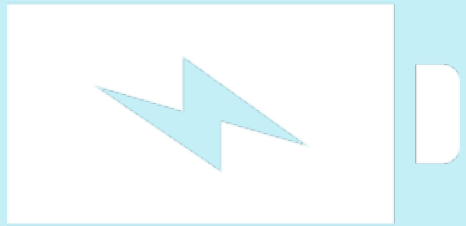


RFID Technology



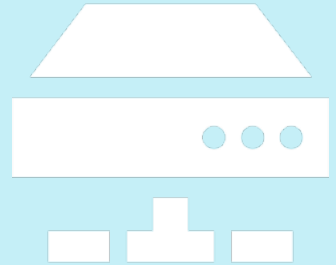
Sensor Technology

Wireless Techno



Energy Harvesting Tec

6loud Computing



IPv6

Essential Technologies Involved in IoT


Billions of devices

Chapter 2

Internet of Things history

WHO CREATE IoT TERMS ?

Global Standard of RFID

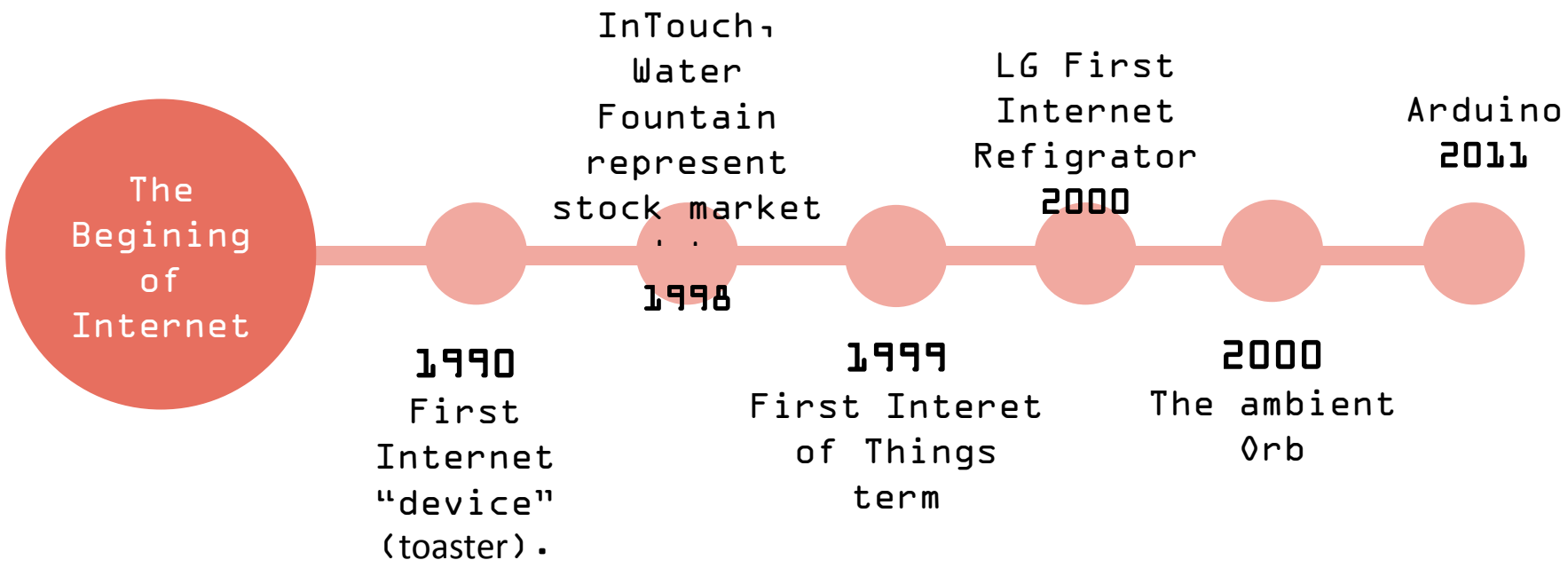
Kevin Ashton

British

"Internet of Things" Terms

System where the Internet is connected to the physical world via ubiquitous sensors (1999)

SHORT IoT TIMELINE



Chapter 3

A bit further on Internet of Things

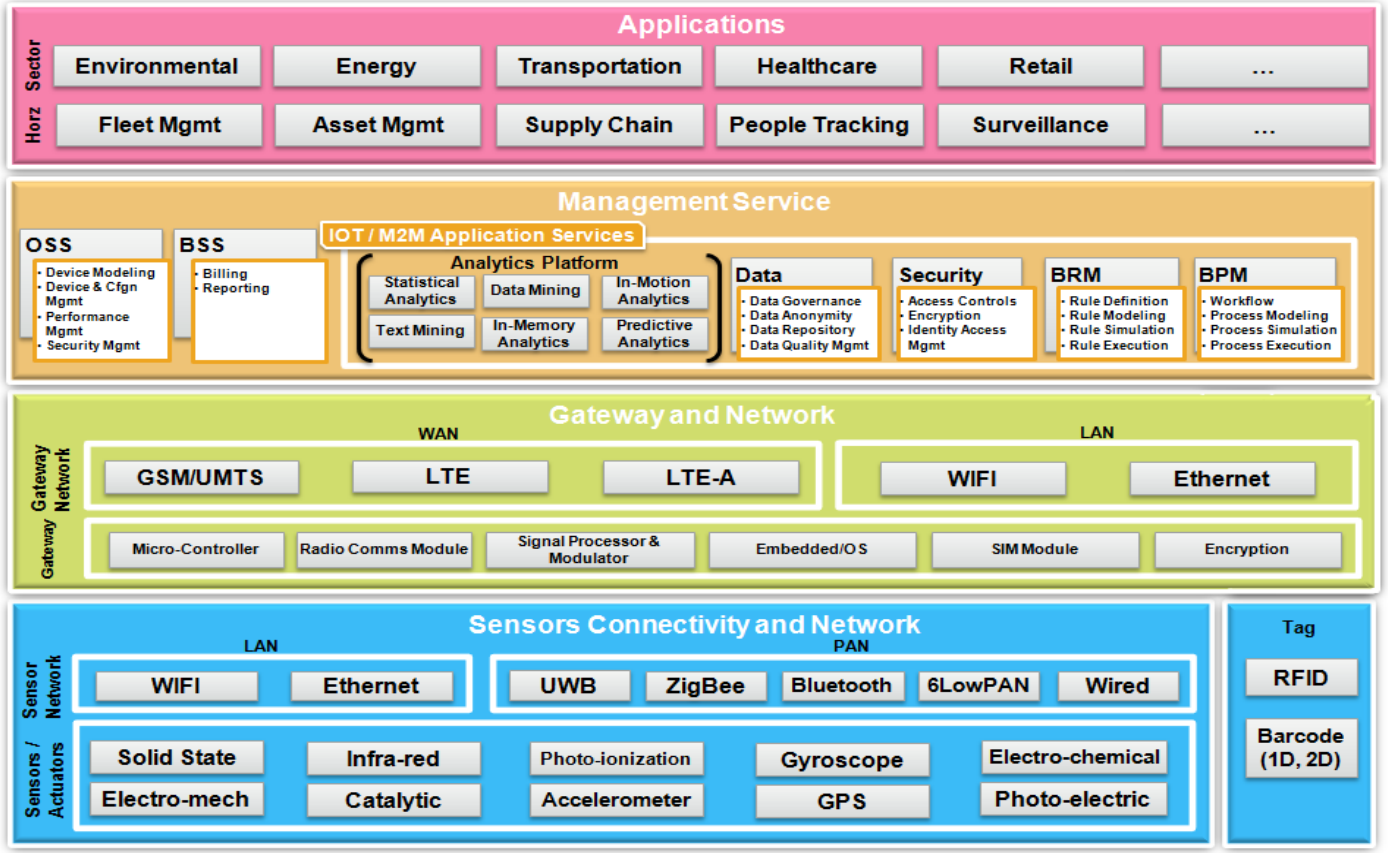
IoT Architecture

APPLICATI

MANAGEMENT SERVICE

GATEWAY AND

SENSOR CONN



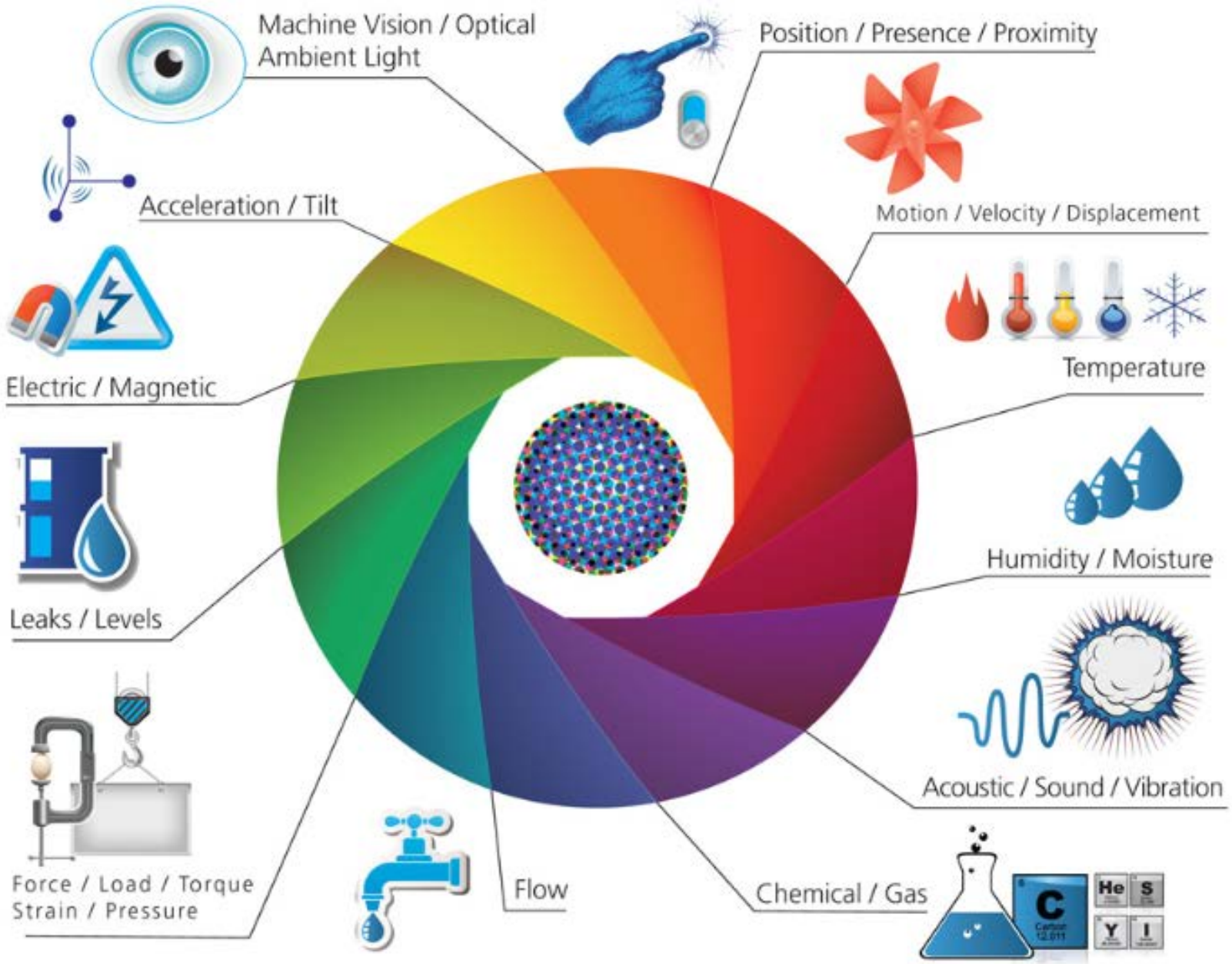
IoT Architecture (Sensor Conn. & Net.)

Lowest Abstraction Layer

Incorporated to measure physical quantities

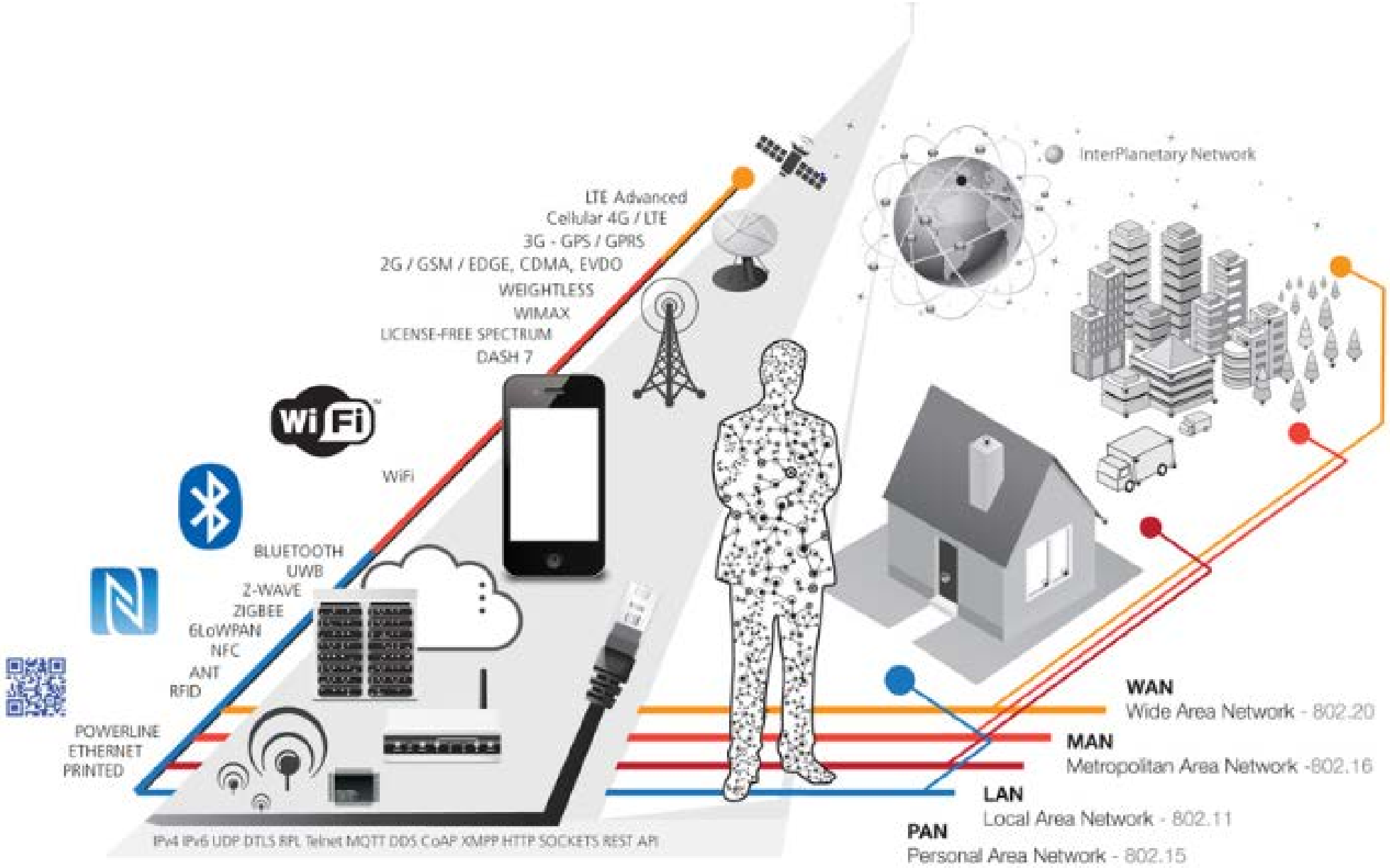
Interconnects the physical and digital world

Collects and process the real time information


Machine Vision / Optical
Ambient Light
Position / Presence / Proximity
Acceleration / Tilt
Motion / Velocity / Displacement
Electric / Magnetic
Temperature
Humidity / Moisture
Leaks / Levels
Acoustic / Sound / Vibration
Force / Load / Torque
Strain / Pressure
Flow
Chemical / Gas

IoT Architecture (Gateway & Network)

Robust and High performance network
infrastructure
Supports the communication requirements
for latency، bandwidth or security
Allows multiple organizations to share and
use the same network independently


InterPlanetary Network
LTE Advanced
Cellular 4G / LTE
3G - GPS / GPRS
2G / GSM / EDGE, CDMA, EVDO
WEIGHTLESS
WIMAX
LICENSE-FREE SPECTRUM
DASH 7
WiFi
BLUETOOTH
UWB
Z-WAVE
ZIGBEE
6LoWPAN
NFC
ANT
RFID
POWERLINE
ETHERNET
PRINTED
IPv4 IPv6 UDP DTLS RPL Telnet MQTT DDS CoAP XMPP HTTP SOCKETS REST API
WAN
Wide Area Network - 802.20
MAN
Metropolitan Area Network -802.16
LAN
Local Area Network - 802.11
PAN
Personal Area Network - 802.15

IoT Architecture (Management Service)

Capturing of periodic sensory data

Data Analytics (Extracts relevant information
from massive amount of raw data)

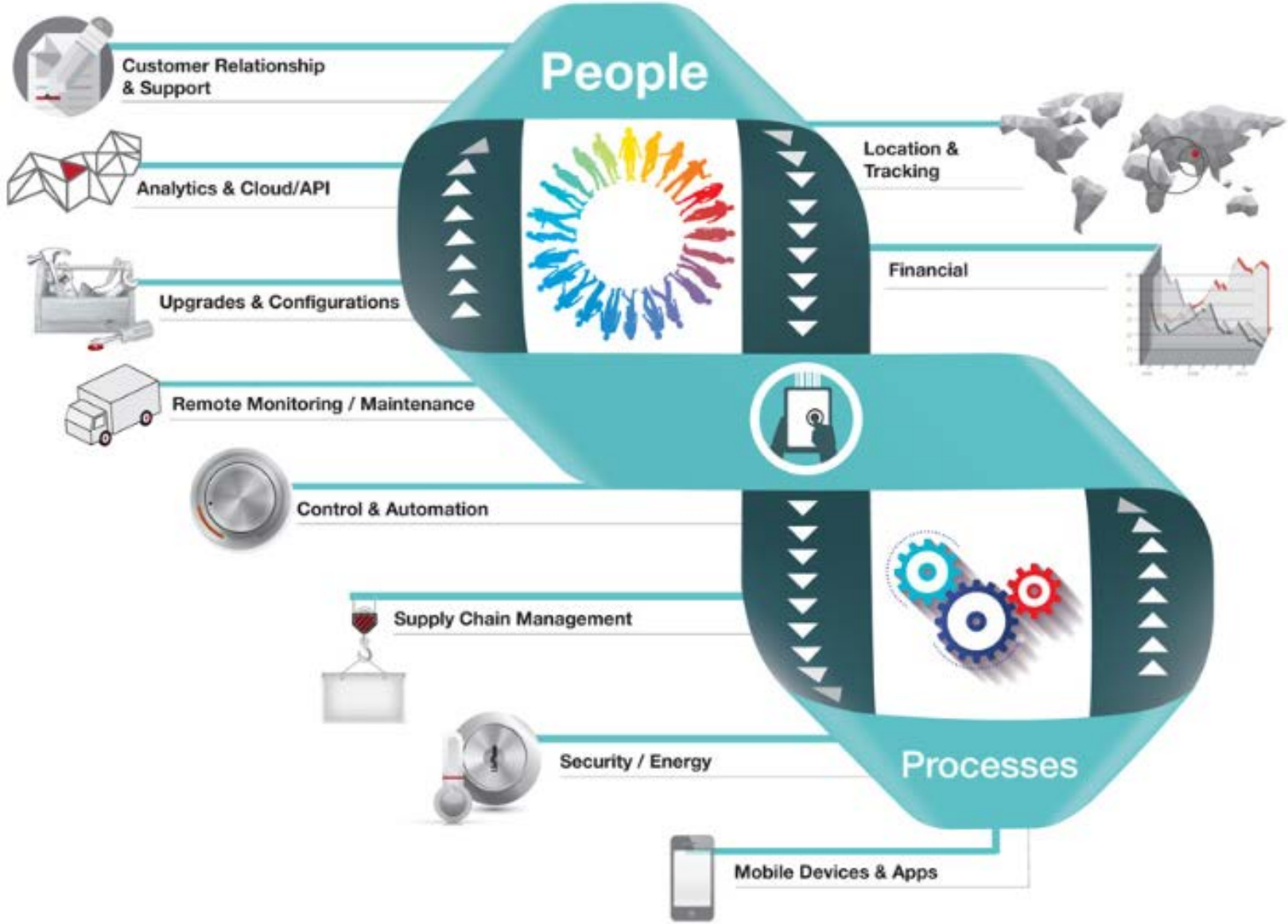
Streaming Analytics (Process real time data)

Ensures security and privacy of data.

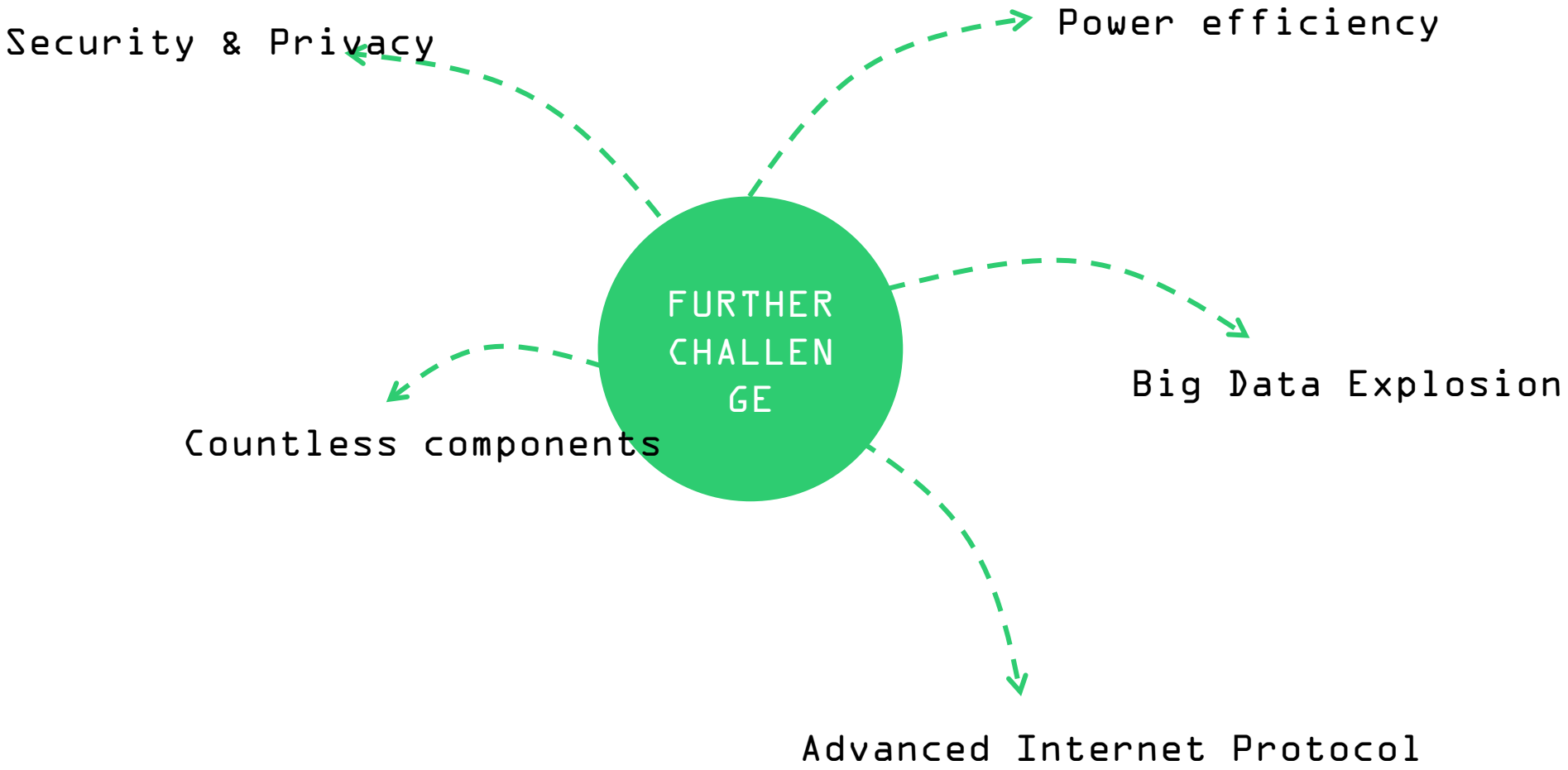
IoT Architecture (Application)

Provides a user interface for using IoT.

Different applications for various sectors like Transportation, Healthcare, Agriculture, Supply chains, Government, Retail etc.


People
Customer Relationship & Support
Analytics & Cloud/API
Upgrades & Configurations
Remote Monitoring / Maintenance
Control & Automation
Supply Chain Management
Security / Energy
Location & Tracking
Financial
Processes
Mobile Devices & Apps

CHALLENGE


Security & Privacy
Power efficiency
FURTHER CHALLEN GE
Countless components
Big Data Explosion
Advanced Internet Protocol

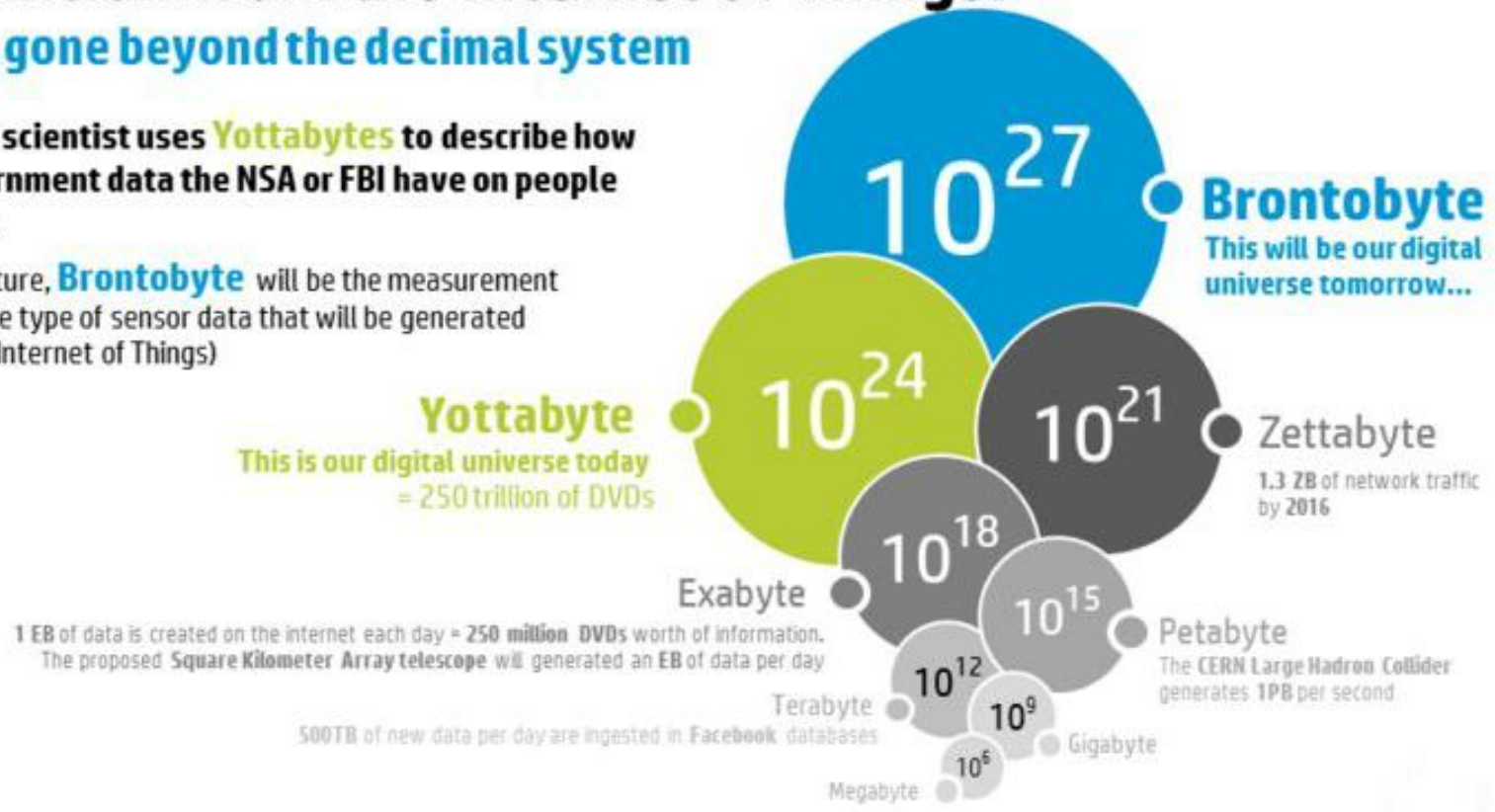
DATA EXPLOSION

Information from the Internet of Things:

We have gone beyond the decimal system

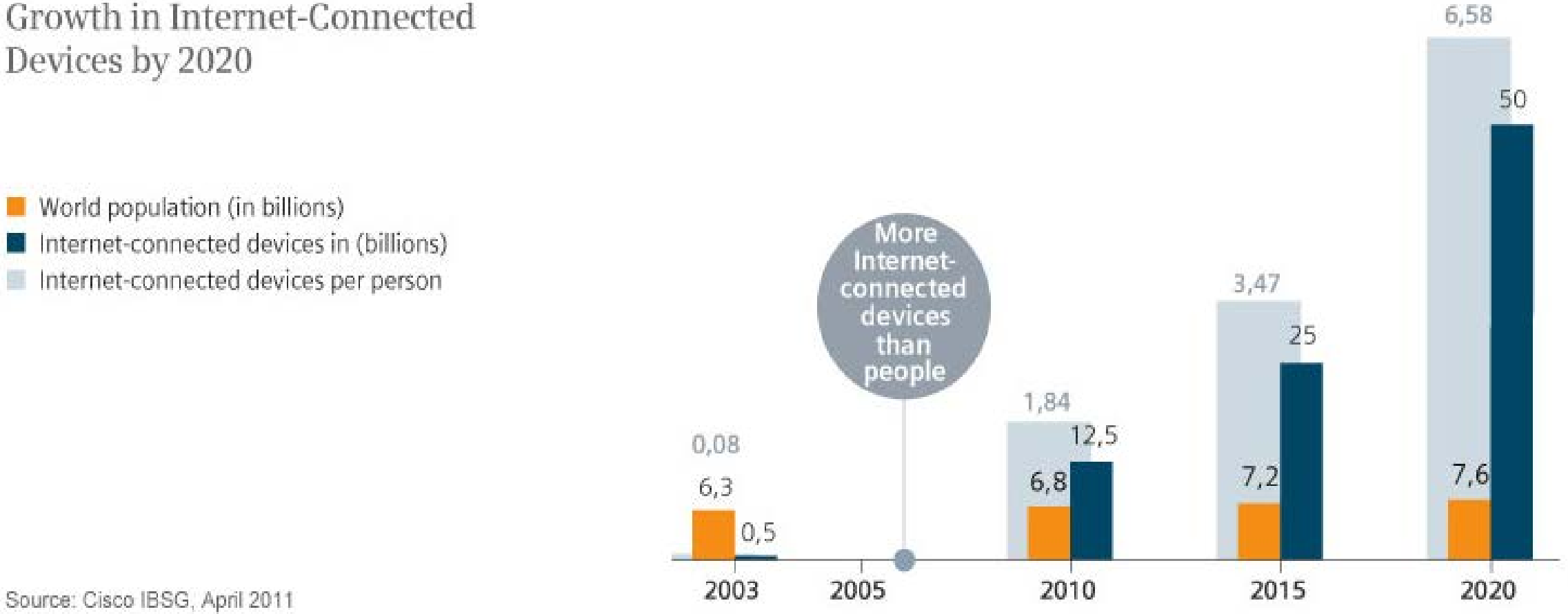
Today data scientist uses Yottabytes to describe how much government data the NSA or FBI have on people altogether.

In the near future, **Brontobyte** will be the measurement to describe the type of sensor data that will be generated from the IoT (Internet of Things)

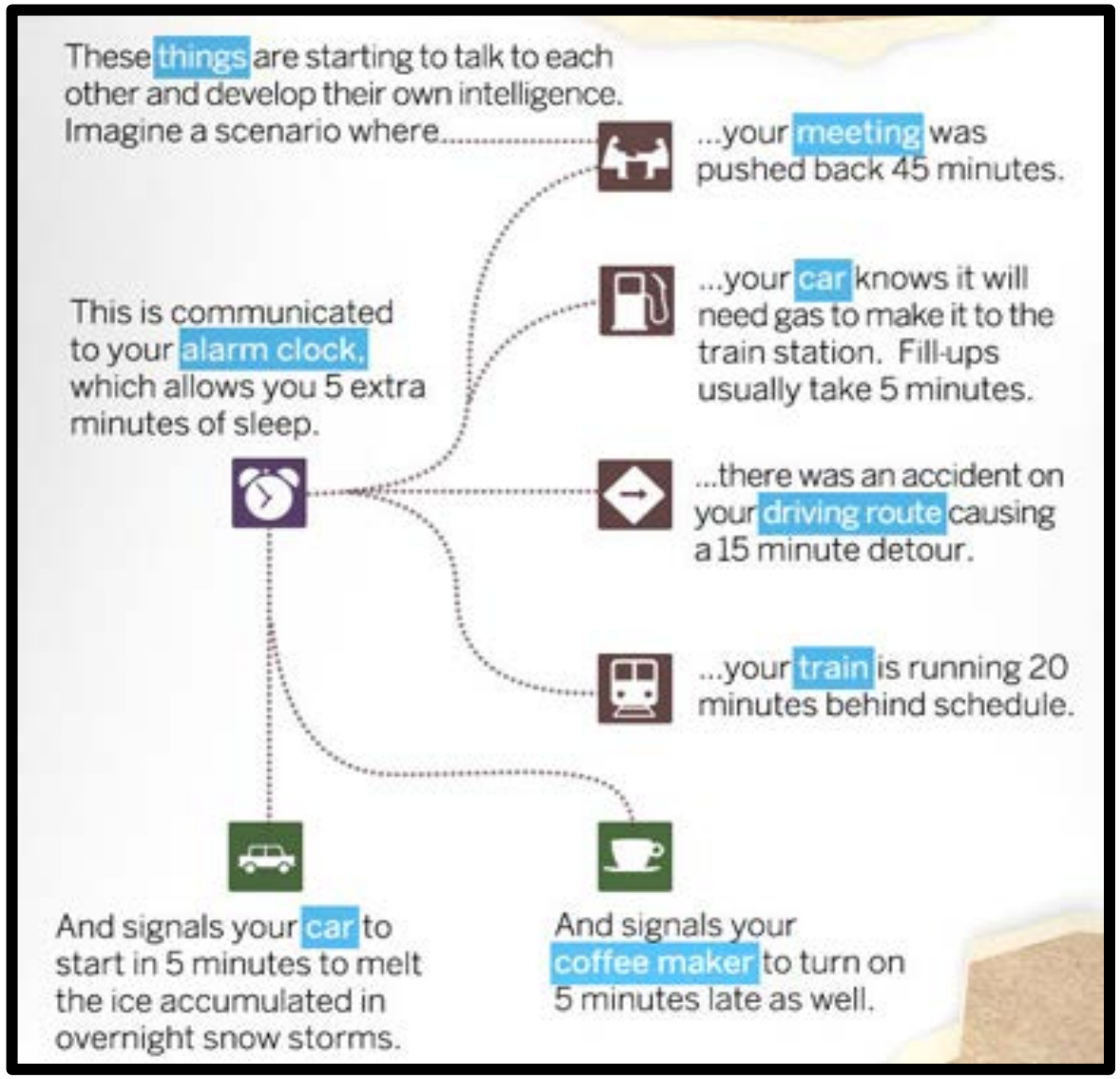


DEVICES GROWTH

Growth in Internet-Connected Devices by 2020



Source: Cisco IBSG, April 2011



FUTURE SCENARIO

- Smart factory
- Smart cities
- Smart grid/energy
- Smart home

Finish