The Internet Of Things?

INTERNET *of* THINGS

Smart Systems and the Internet of Things are driven by a combination of:
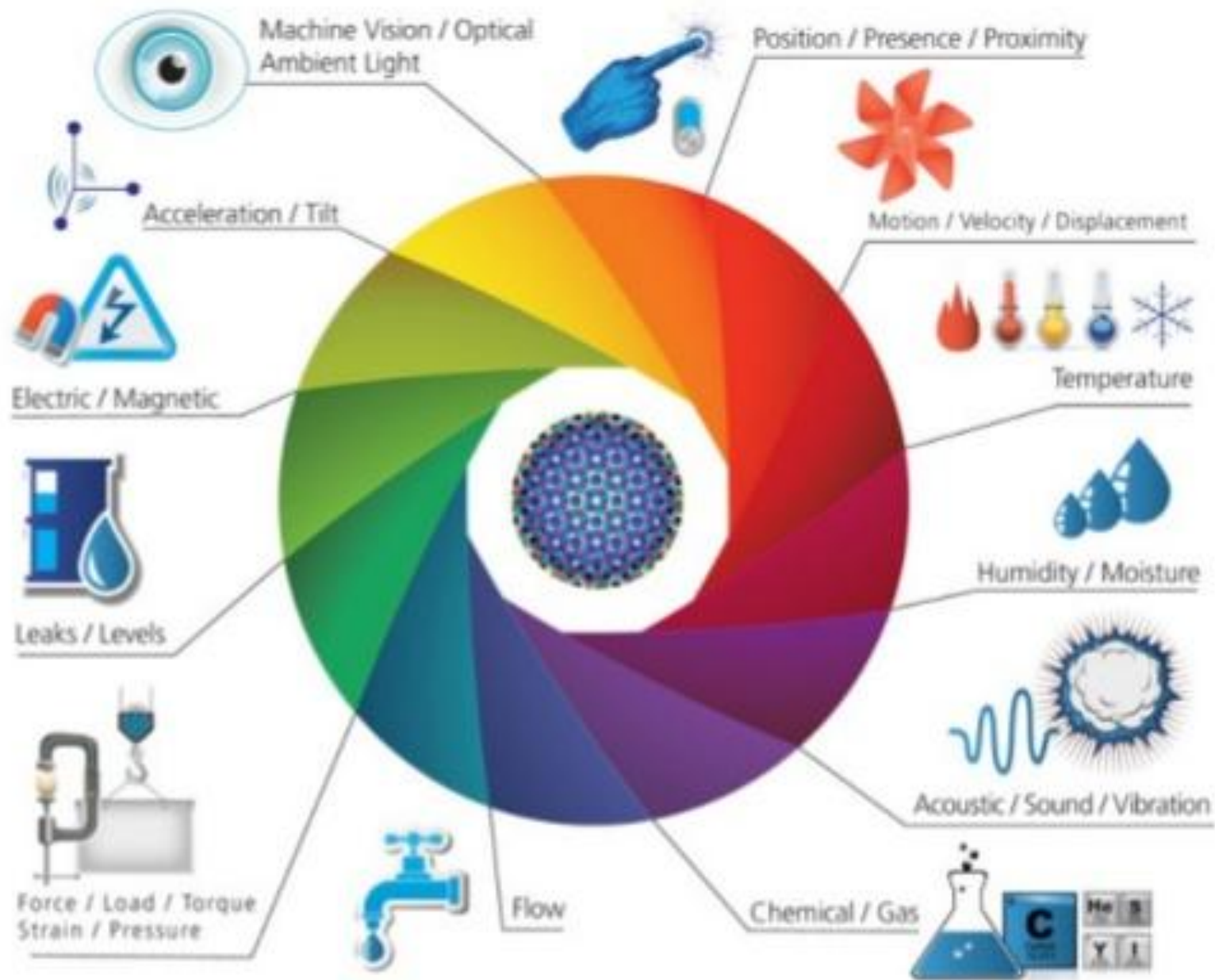
1. **SENSORS** & ACTUATORS
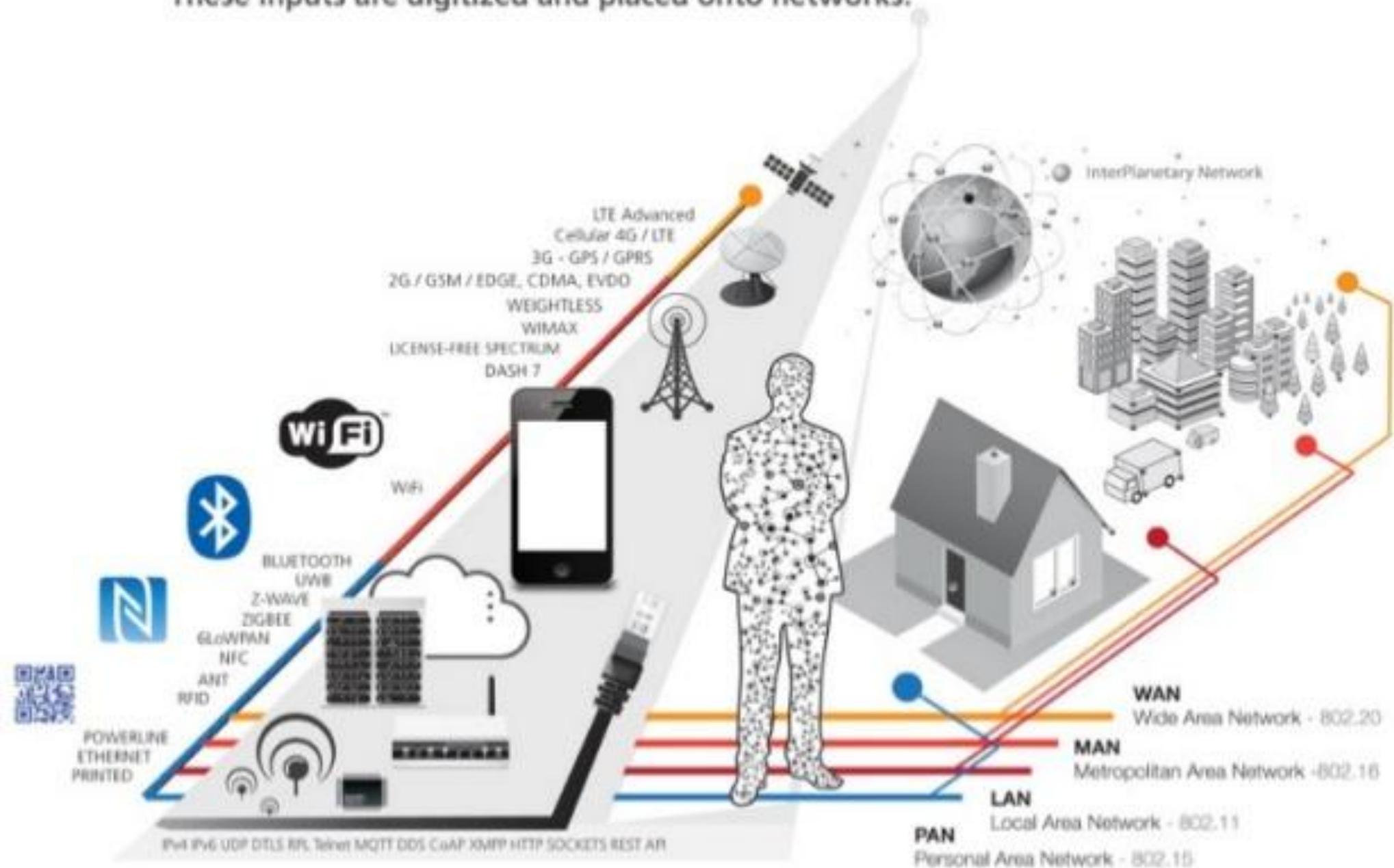
2. **CONNECTIVITY**

3. **PEOPLE & PROCESSES**

① SENSORS & ACTUATORS

We are giving our world a digital nervous system. Location data using GPS sensors. Eyes and ears using cameras and microphones, along with sensory organs that can measure everything from temperature to pressure changes.

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

② CONNECTIVITY

These inputs are digitized and placed onto networks.

InterPlanetary Network

LTE Advanced
Cellular 4G / LTE
3G - GPS / GPRS
2G / GSM / EDGE, CDMA, EVDO
WEIGHTLESS
WIMAX
LICENSE-FREE SPECTRUM
DASH 7

WiFi

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

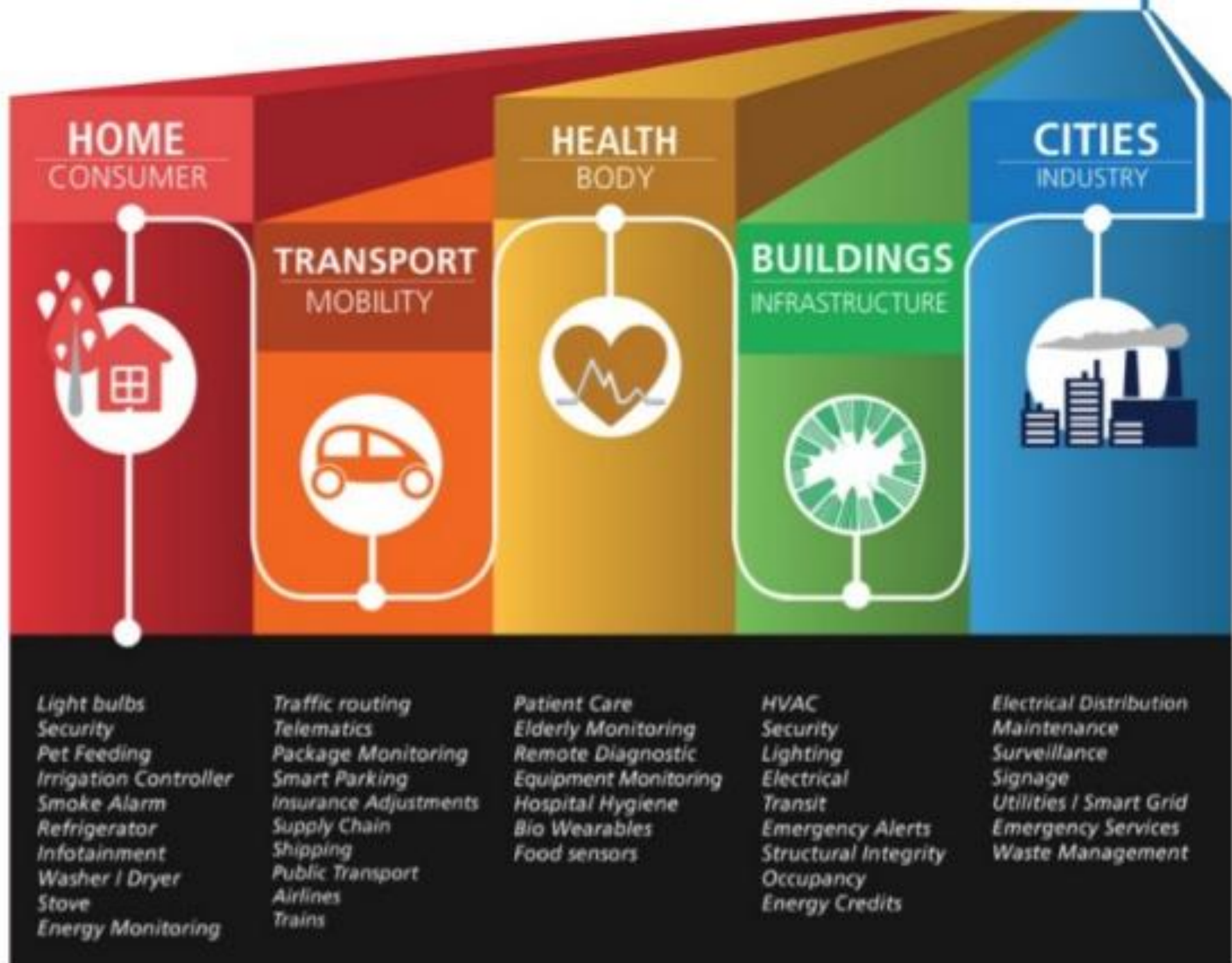**PAN**
Personal Area Network - 802.15

3 PEOPLE & *PROCESSES*

These networked inputs can then be combined into bi-directional systems that integrate data, people, processes and systems for better decision making.
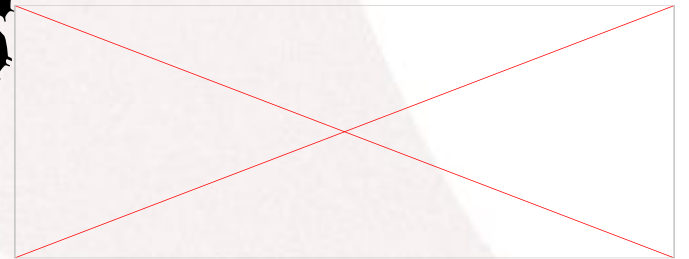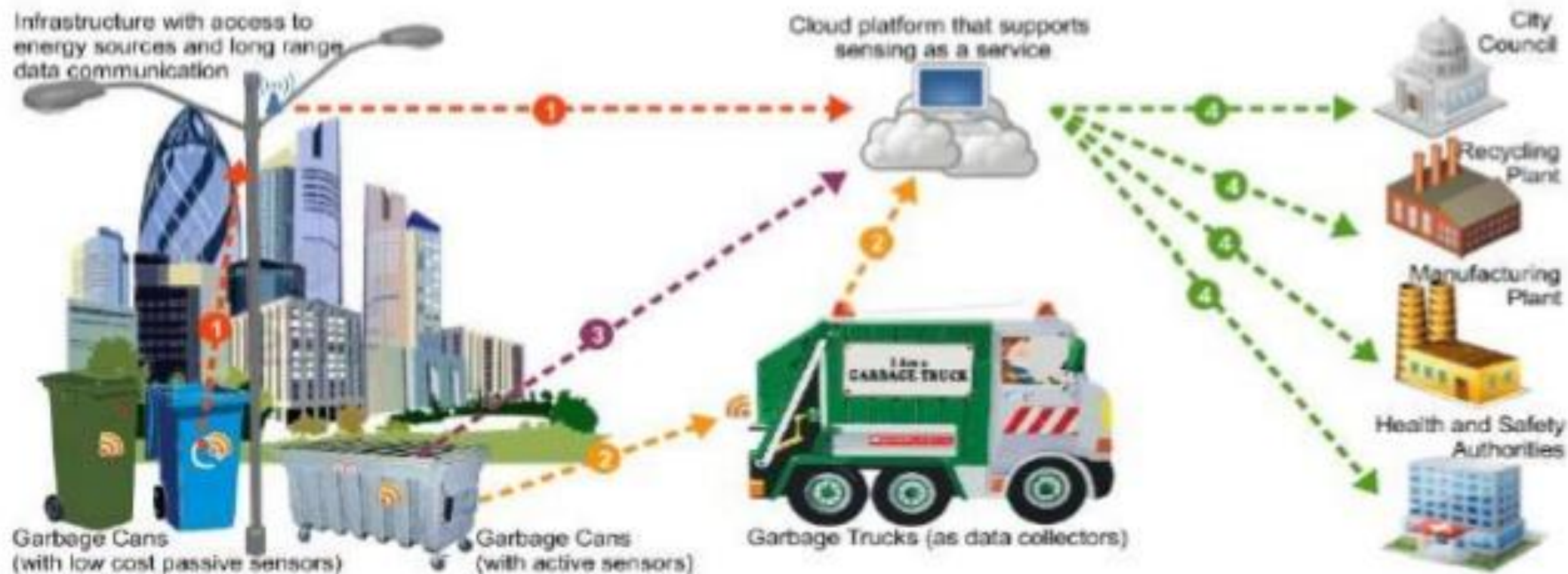

People

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
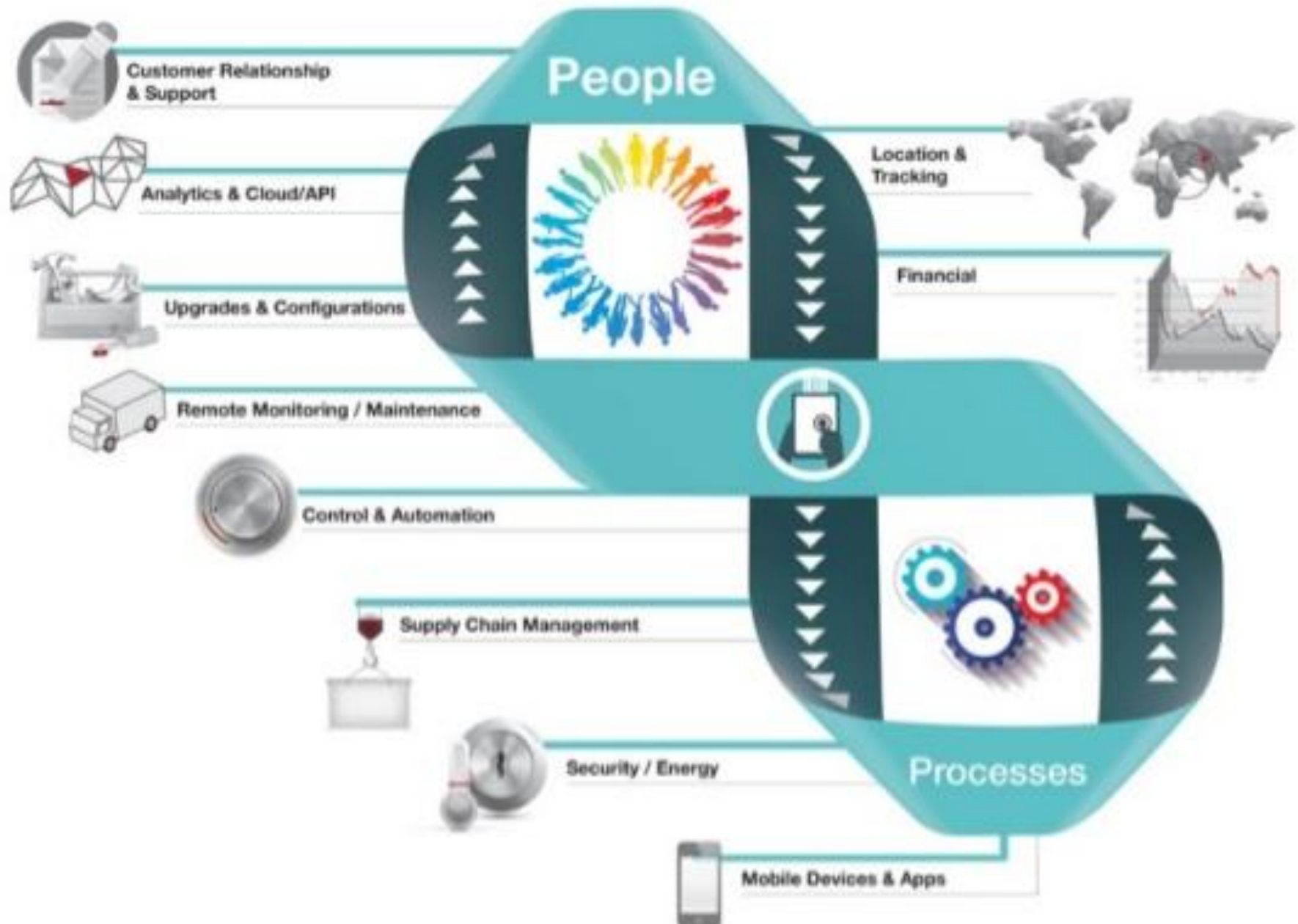
TO ➤ DIVERSE APPLICATIONS

HOME
CONSUMER

TRANSPORT
MOBILITY

HEALTH
BODY

BUILDINGS
INFRASTRUCTURE

CITIES
INDUSTRY

HOME CONSUMER	TRANSPORT MOBILITY	HEALTH BODY	BUILDINGS INFRASTRUCTURE	CITIES INDUSTRY
Light bulbs	Traffic routing	Patient Care	HVAC	Electrical Distribution
Security	Telematics	Elderly Monitoring	Security	Maintenance
Pet Feeding	Package Monitoring	Remote Diagnostic	Lighting	Surveillance
Irrigation Controller	Smart Parking	Equipment Monitoring	Electrical	Signage
Smoke Alarm	Insurance Adjustments	Hospital Hygiene	Transit	Utilities / Smart Grid
Refrigerator	Supply Chain	Bio Wearables	Emergency Alerts	Emergency Services
Infotainment	Shipping	Food sensors	Structural Integrity	Waste Management
Washer / Dryer	Public Transport		Occupancy	
Stove	Airlines		Energy Credits	
Energy Monitoring	Trains			

Where is IoT ..????

- IoT is around us
- In your school
- In your college
- At your home
- At theaters
- At hospitals

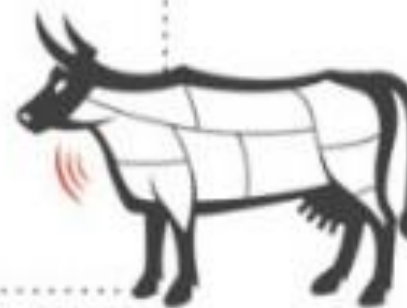# Efficient Waste Management in Smart Cities Supported by the Sensing-as-a-Service

DIGITAL FARM TO TABLE

- ● Farm & Livestock ID & Sensors
- ● Food packaging sensors
- ● Retail Supply Chain Monitoring
- ● Health Services

Cattle
AIN: 840 003 123 456 789

Location: ID: Braymeadow Farm FR #0026543543
Slaughterhouse ID: #4528343
Sensor: Temperature, Accelerometer
Connectivity: RFID, NFC, WAN

Maria and her daughter are picking up groceries for the week. Using packaging with printed sensors, the two can make sure the ground beef they are purchasing has never reached unsafe temperature levels while on the shelf or being transported.

The packaging also contains a QR code which they can use to query the cow's RFID tag and bring up its history:

- Where it was raised
- What it was fed
- Where it was slaughtered
- How it was transported
- Where it was packaged
- The last time it was inspected.

A week later the U.S. Department of Agriculture's Food Safety Service determines ground beef from originating from a regional packing company and sold at a neighboring store is contaminated with E. coli O157:H7. All packages from this distributer change their alert color and notification messages are sent to those shoppers that may have been impacted.

"Big Data is not magic. It doesn't matter how much data you have if you can't make sense of it."

Sensors in even the holy cow!

In the world of IoT, even the cows will be connected and monitored. Sensors are implanted in the ears of cattle. This allows farmers to monitor cows' health and track their movements, ensuring a healthier, more plentiful supply of milk and meat for people to consume. On average, each cow generates about 200 MB of information per year.

HOW MANY STEPS **HAVE YOU** WALKED TODAY?

124 BPM
5,1   314 kcal

08:31

11:25

VECTOR EPS10

10:42
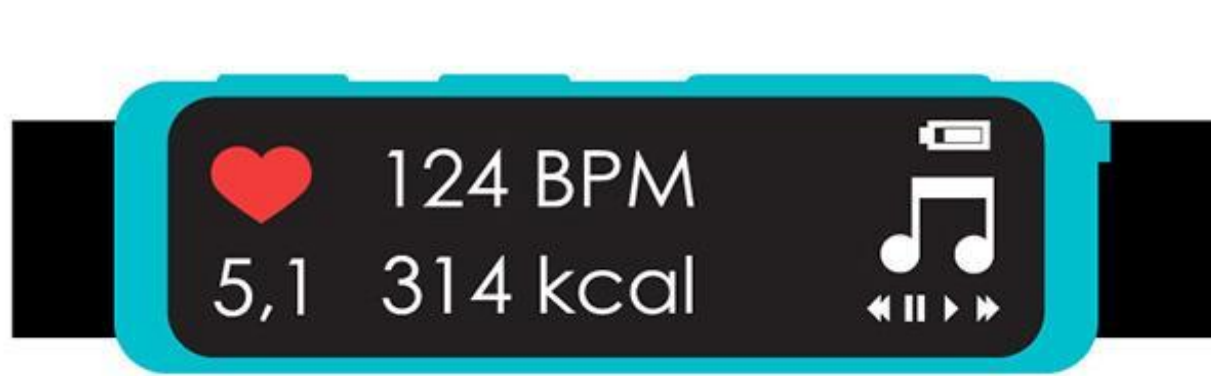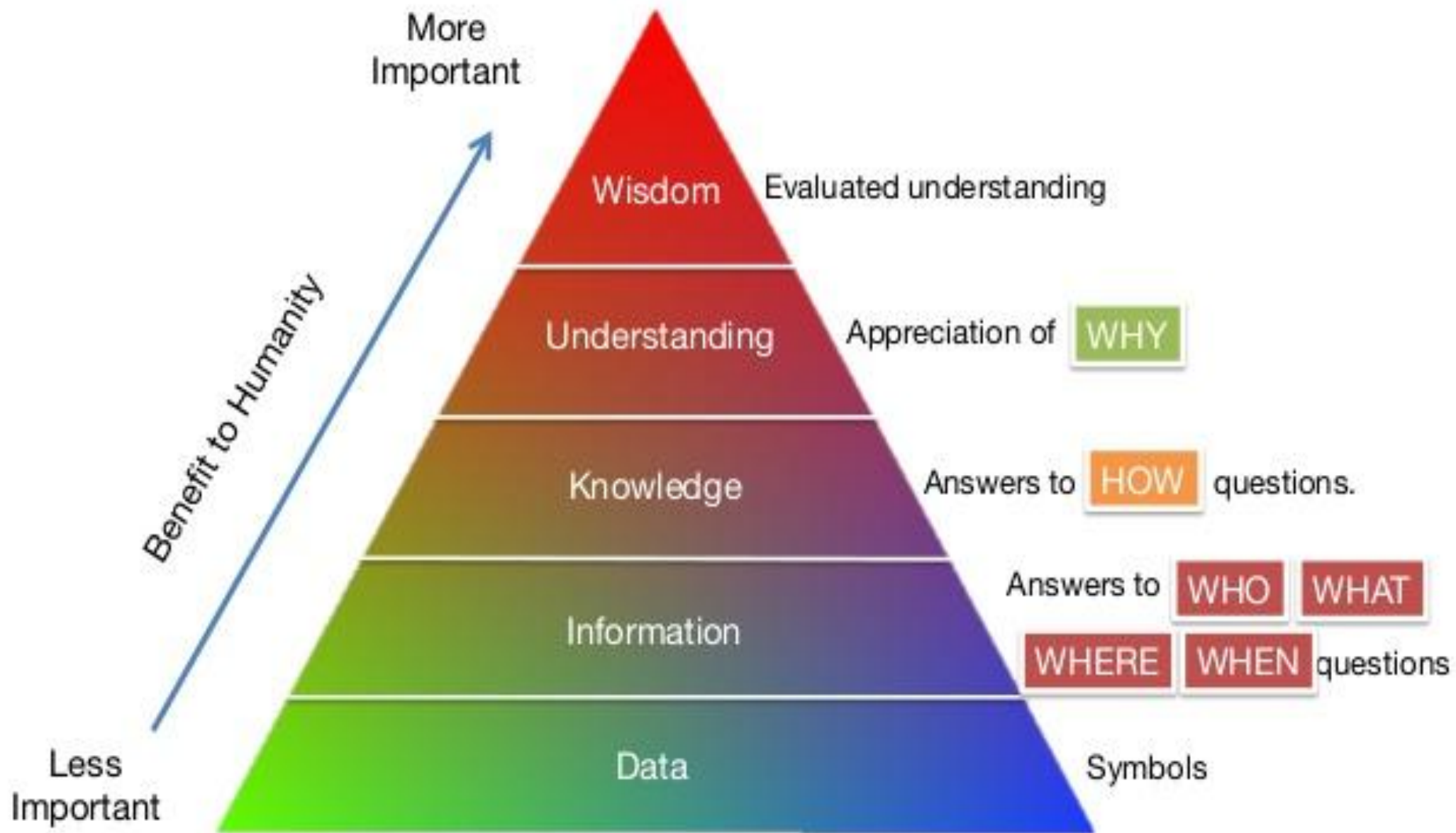
The more data that is created, the better understanding and wisdom people can obtain.
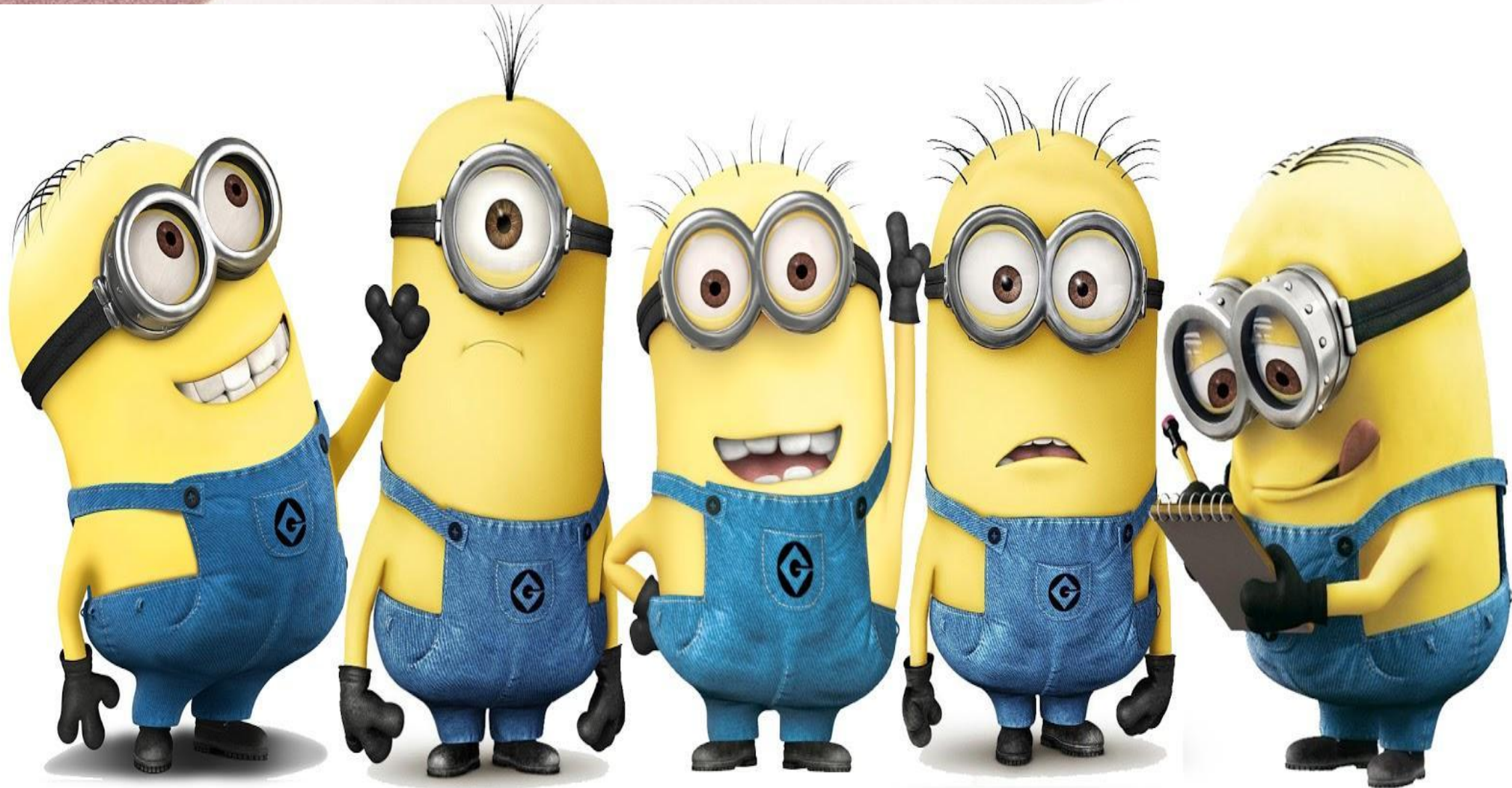
How IoT Should Be Configured

a new religion

What if misconfigured

SUMMARY

Internet of Things
Only Tip of an Iceberg

QUERIES..?

thank you!