

Internet of Things (IoT)

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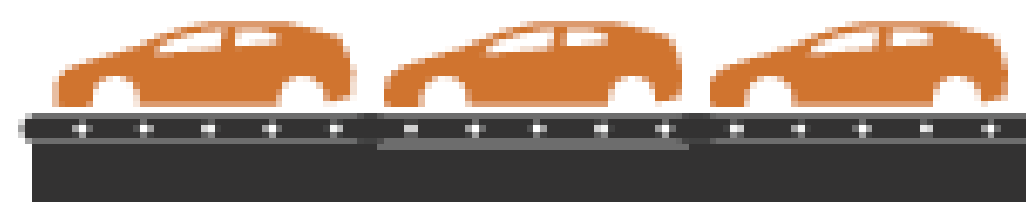
...unleashing the full potential of men & machines

INDUSTRIAL REVOLUTIONS



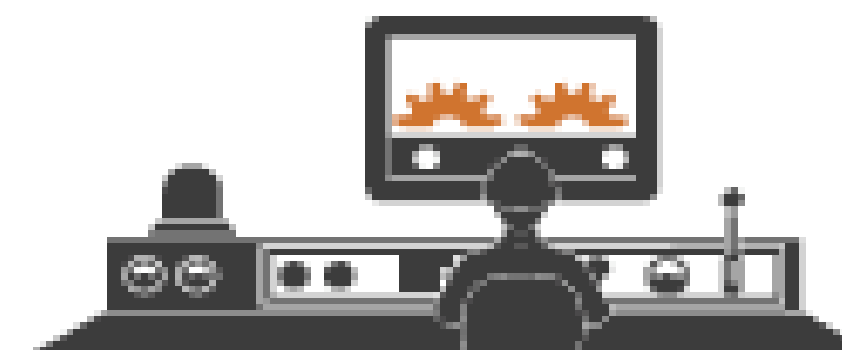
1st
1780s

COAL
Water Power
Steam Power / Engine
Mechanization



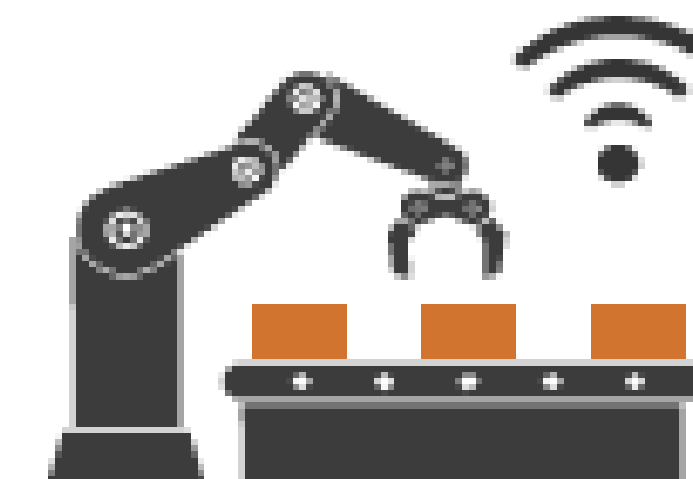
2nd
1880s

PETROLEUM / GAS
Electricity
Mass production
Assembly line



3rd
1980s

Electronics
Computers
Automation
IT



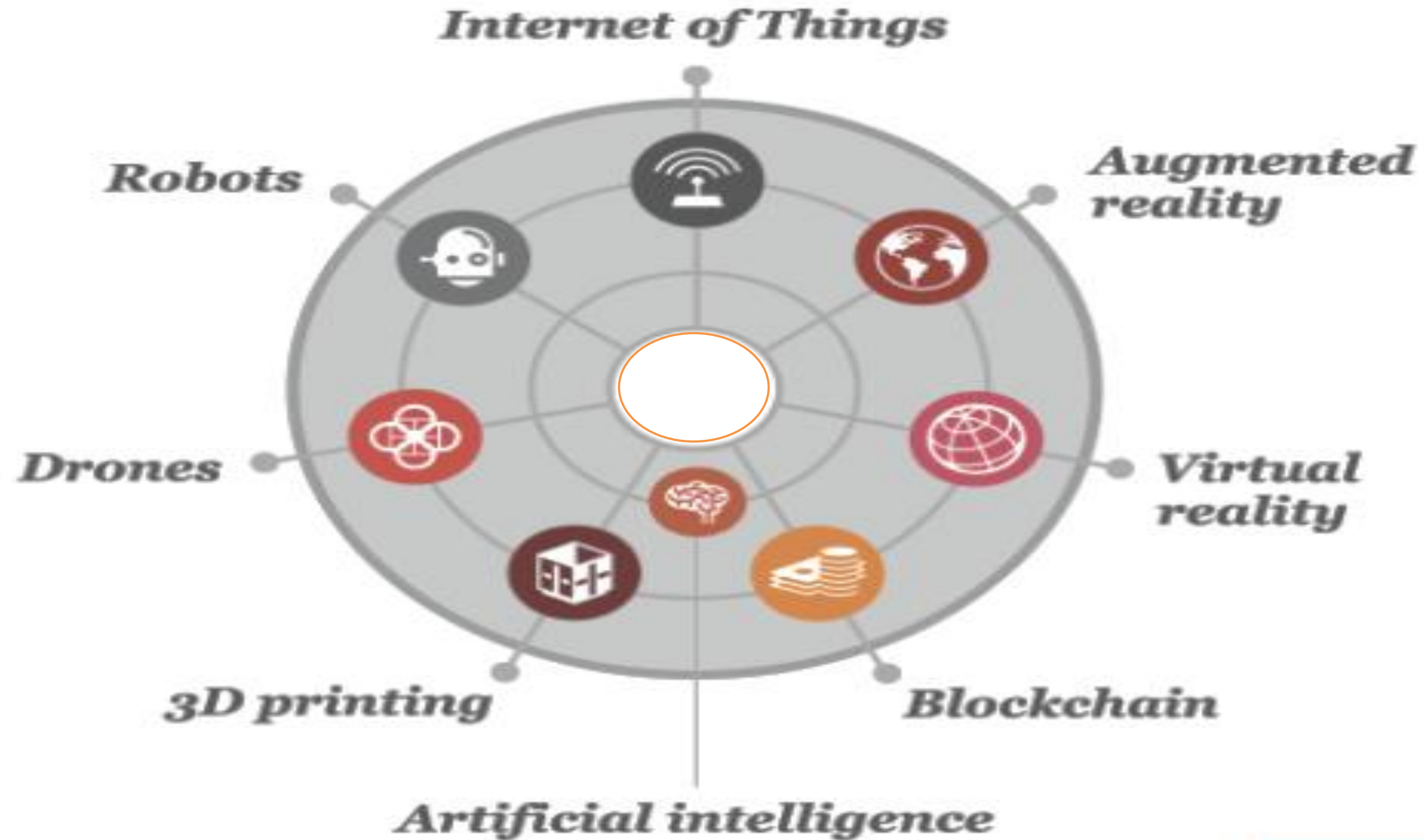
4th
NOW

Internet and Renewable Energy
Hyper-connectivity
Cyber-physical System
Internet of Things



Technologies Driving

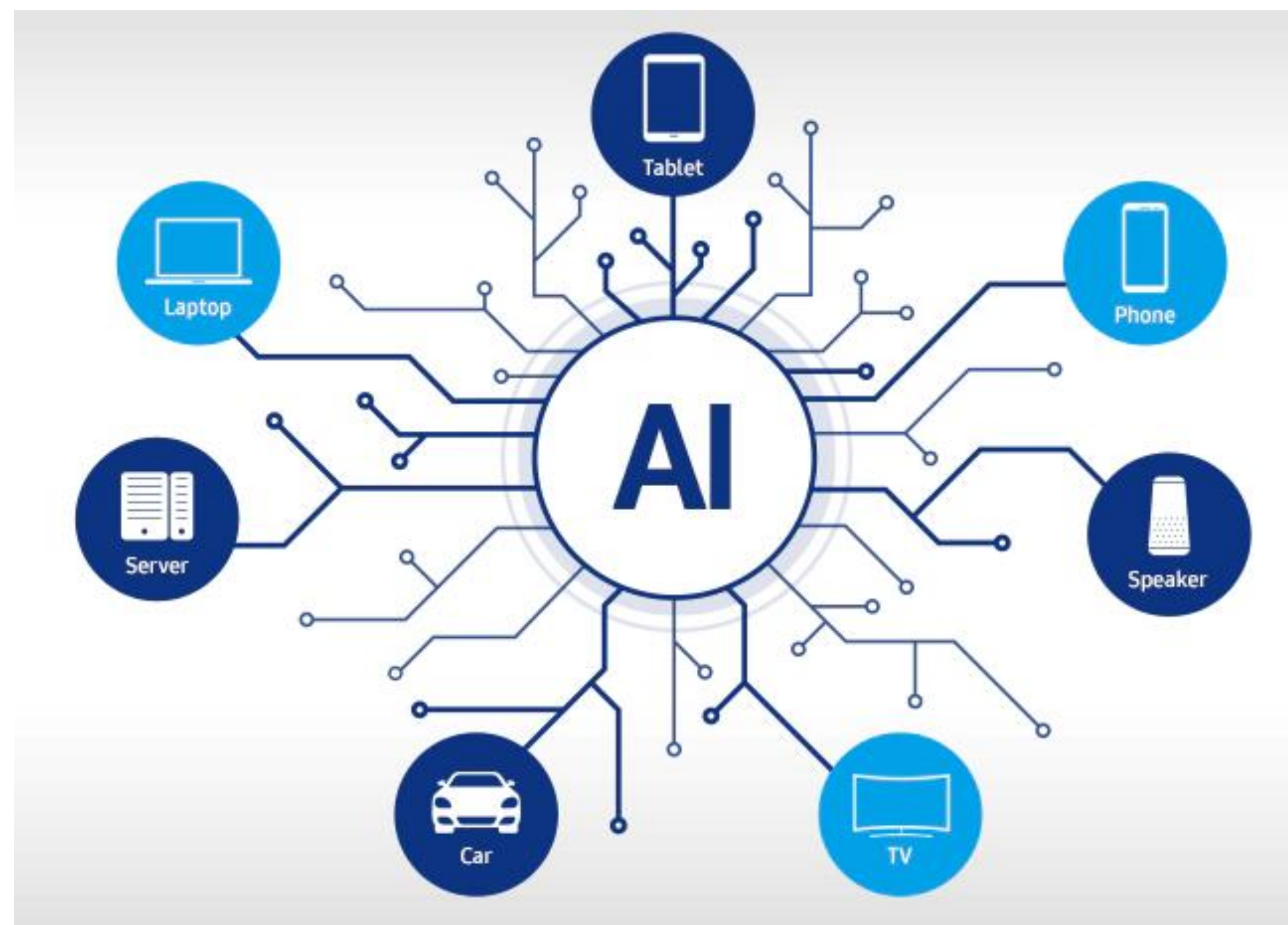
CHANGE



Artificial intelligence



Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems.



Augmented reality



Augmented reality is an enhanced, interactive version of a real-world environment achieved through digital visual elements, sounds, and other sensory stimuli via holographic technology.



Virtual Reality (VR)



Virtual Reality (VR) is a computer-generated environment with scenes and objects that appear to be real, making the user feel they are immersed in their surroundings.



Robotics & drone tech.

The objective of the robotics field is to create intelligent machines that can assist humans in a variety of ways. Robotics can take on a number of forms.

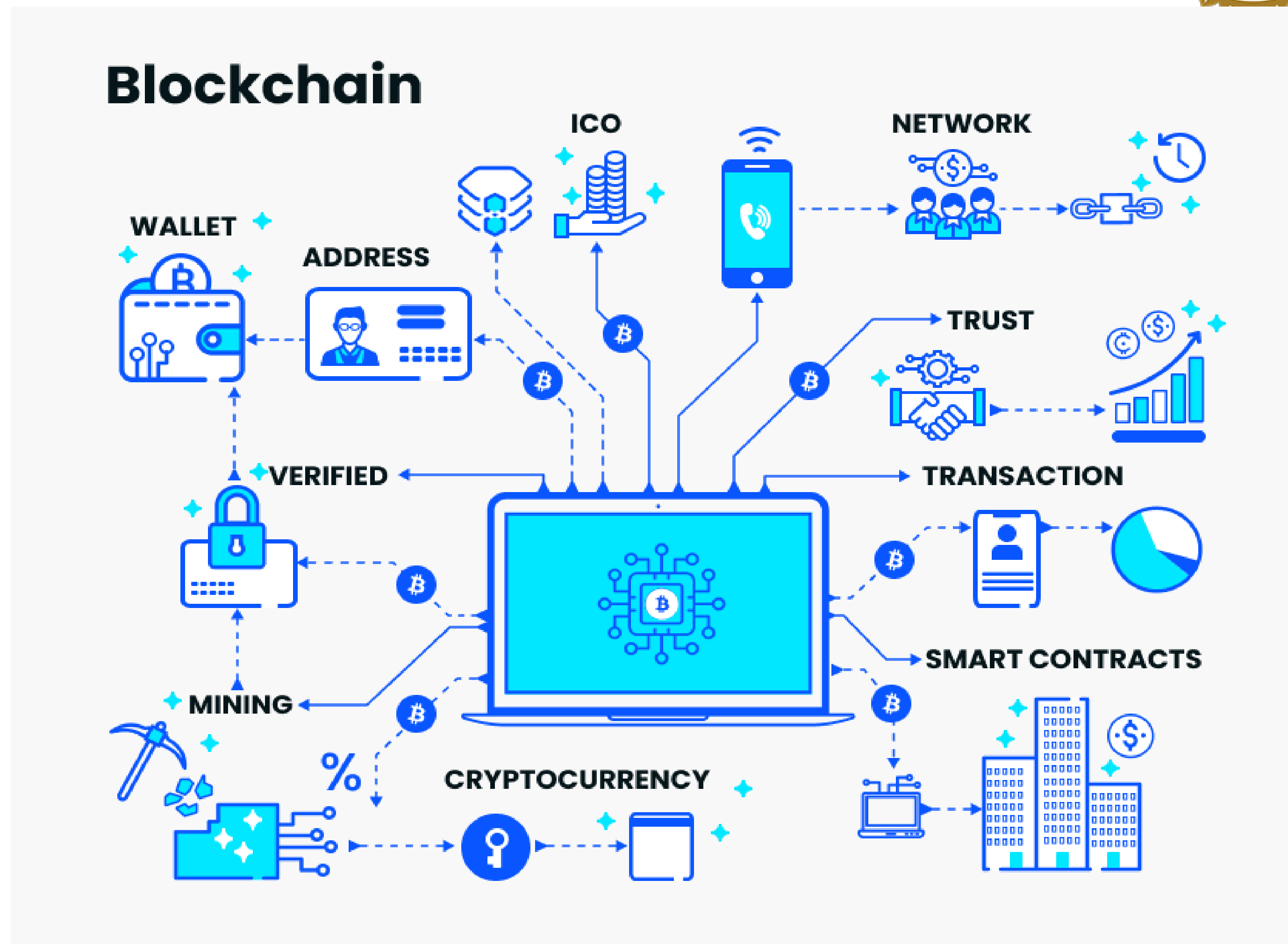
Drone is a flying robot that can be remotely controlled or fly autonomously



Blockchain technology



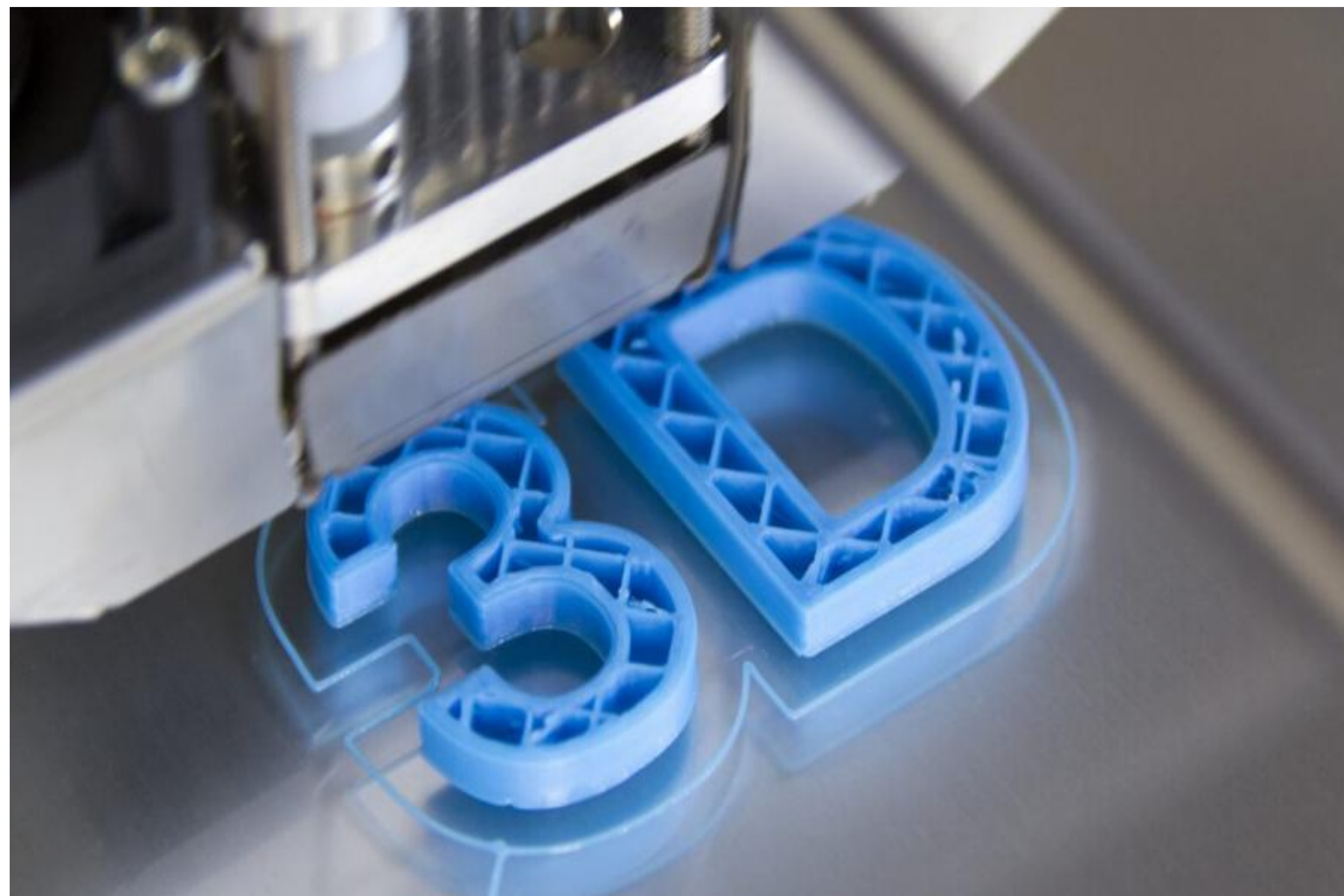
Blockchain technology is an advanced database mechanism that allows transparent information sharing within a business network.



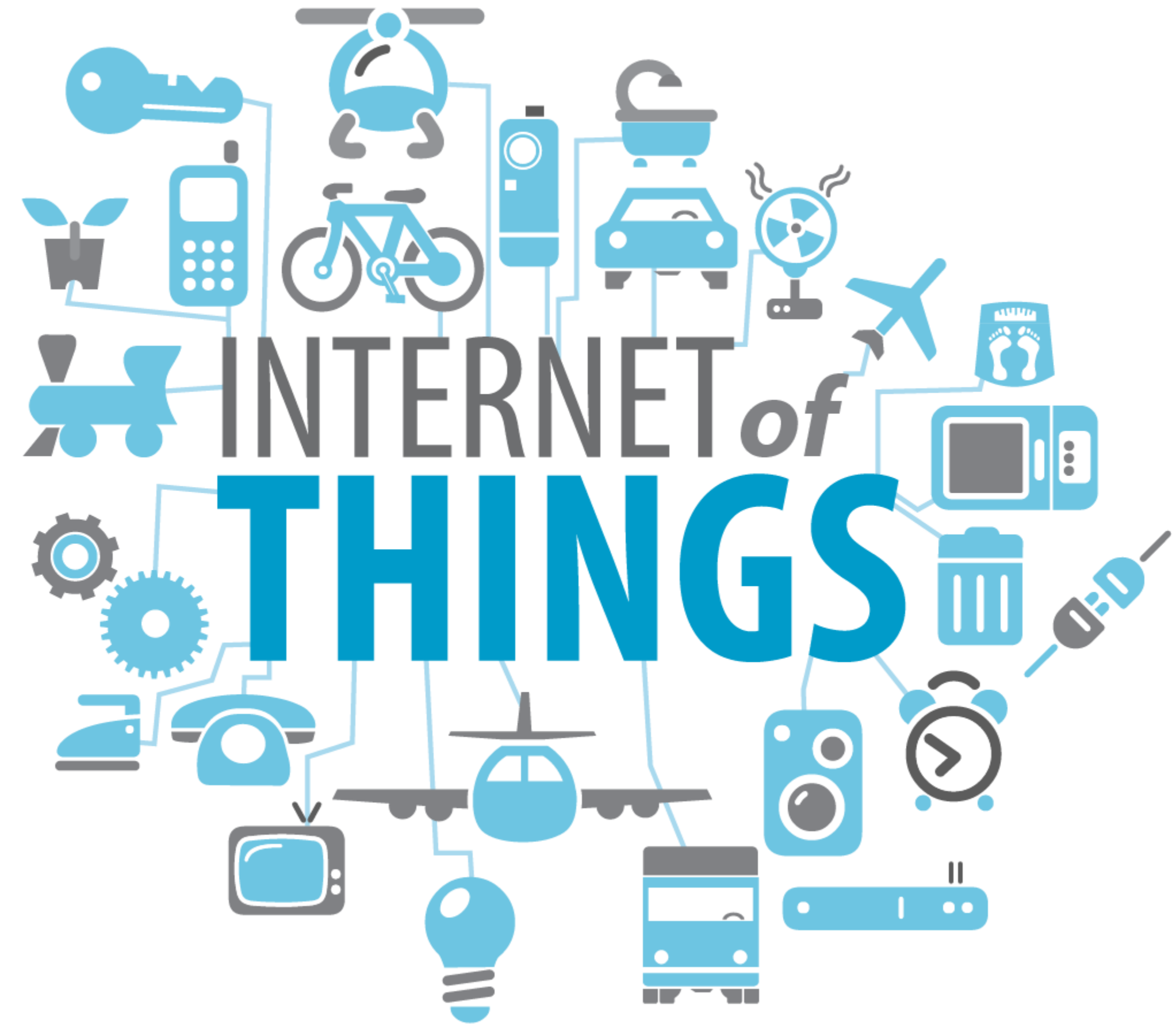
3-d Printing technology



3D printing is a manufacturing technology that allows the creation of physical objects from digital models



IoT is the ecosystem of internet-connected smart devices and technologies in our homes, cities, and workplaces that continuously collect data.





Internet of Things (IoT)

The **Internet of Things (IoT)** is a network of physical objects called -“**things**”- that are embedded with sensors, software and other technologies for the purpose of connecting and exchanging data with other devices over the **internet**

How Does This Impact You?



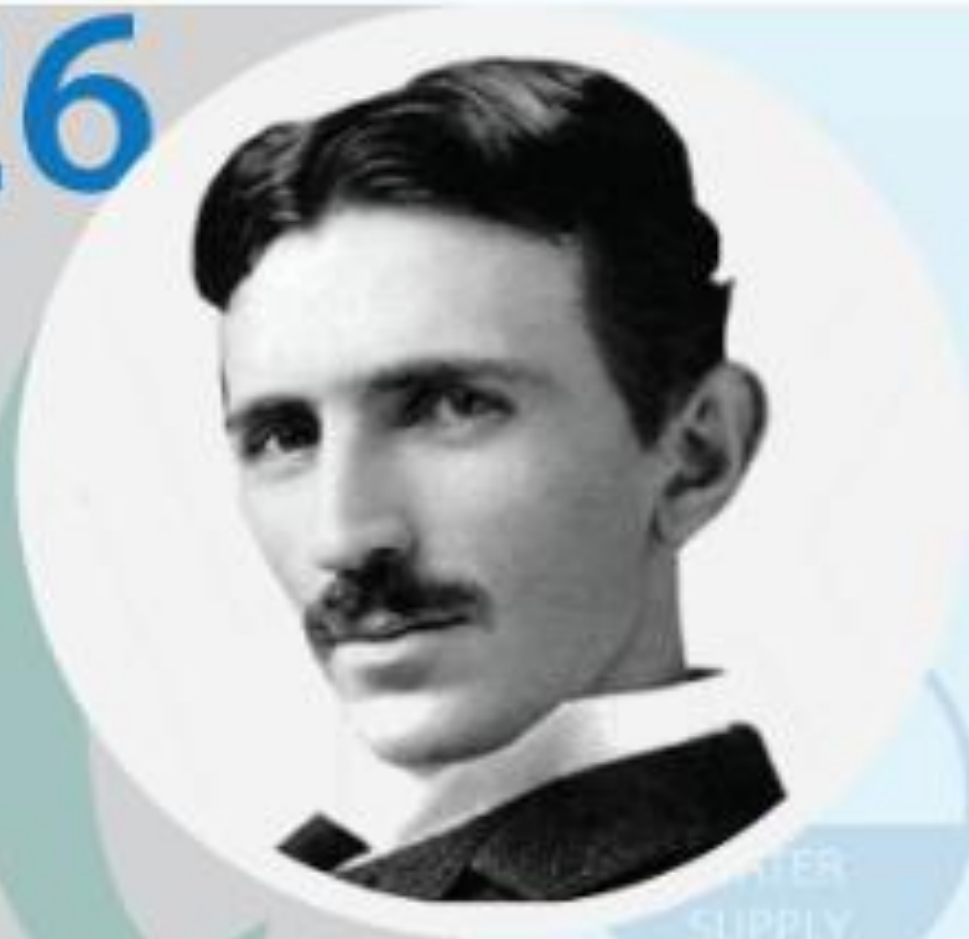
- IoT allows electrical items to connect, conserving and saving money and energy properly.
 - IoT improves the efficiency of our systems
 - IoT makes human life easy
 - IoT provides security.
-
- The Ultimate Goal of IoT is to Automate Human Life



IoT - History



1926



Nicola Tesla

"When **wireless** is perfectly applied the whole earth will be converted into a huge brain, which in fact it is, all things being particles of a real and rhythmic whole... and the instruments through which we shall be able to do this will be amazingly simple compared with our present telephone. A man will be able to carry one **in his vest pocket**."

- Nicola Tesla

Nikola Tesla's Legacy: From AC to IoT

Kevin Aston Father of Internet of Things

1999



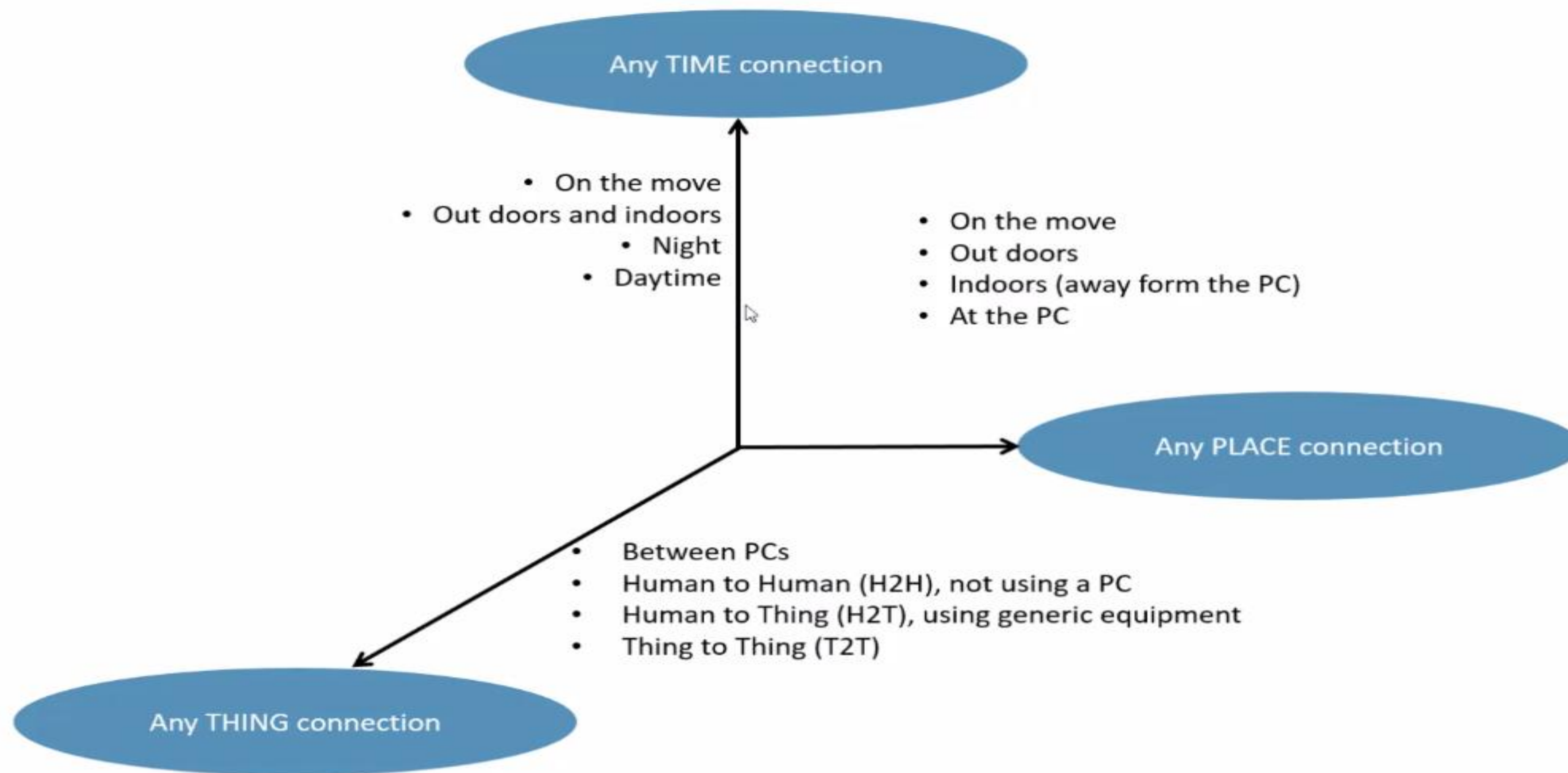
Kevin Ashton

"I could be wrong, but I'm fairly sure the **phrase "Internet of Things"** started life as the title of a presentation I made at **Procter & Gamble (P&G)** in 1999.

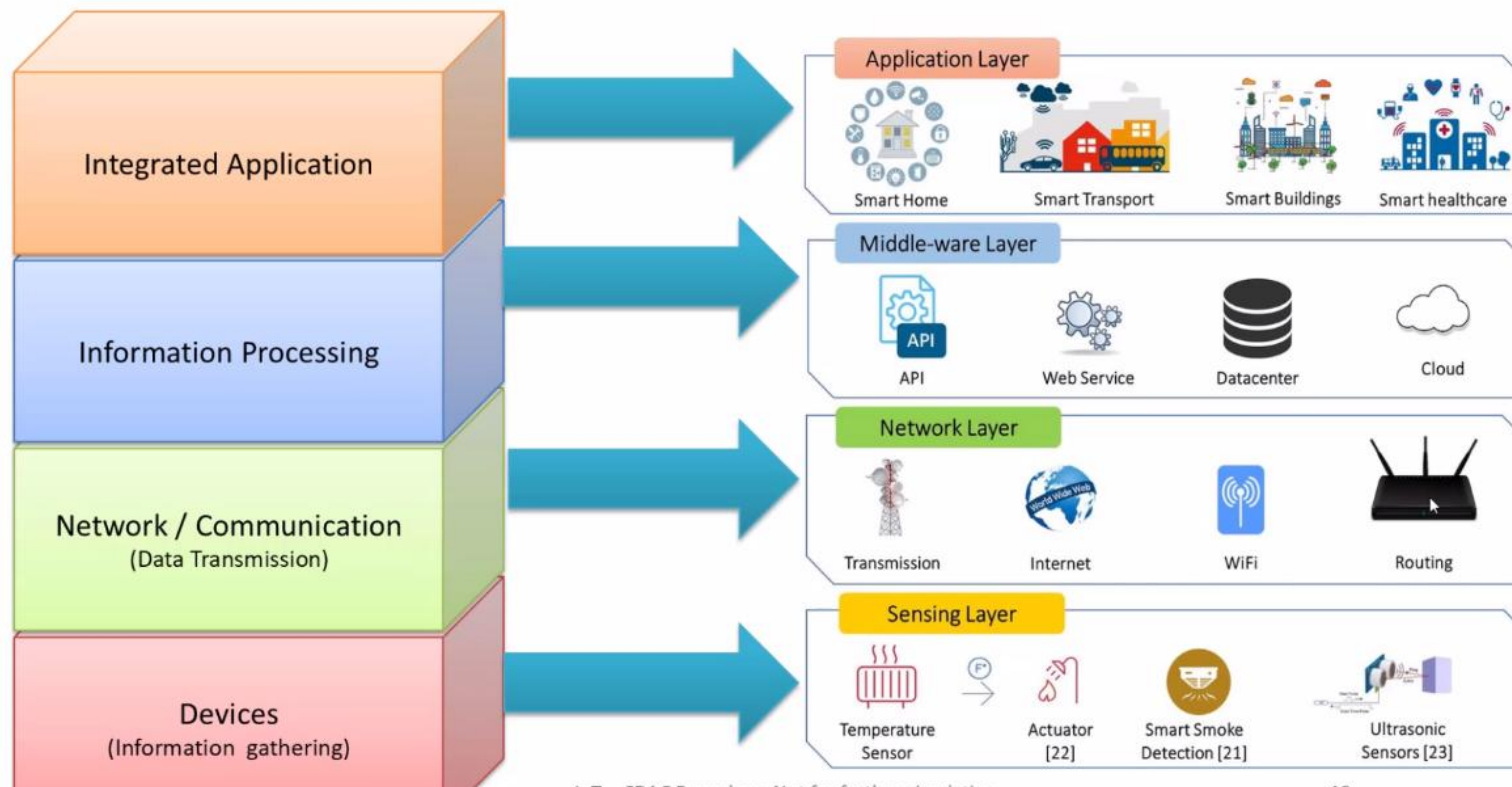
Linking the new idea of RFID in P&G's supply chain to the then-red-hot topic of the Internet was more than just a good way to get executive attention."

- Kevin Ashton

Goal : Complete Ubiquity



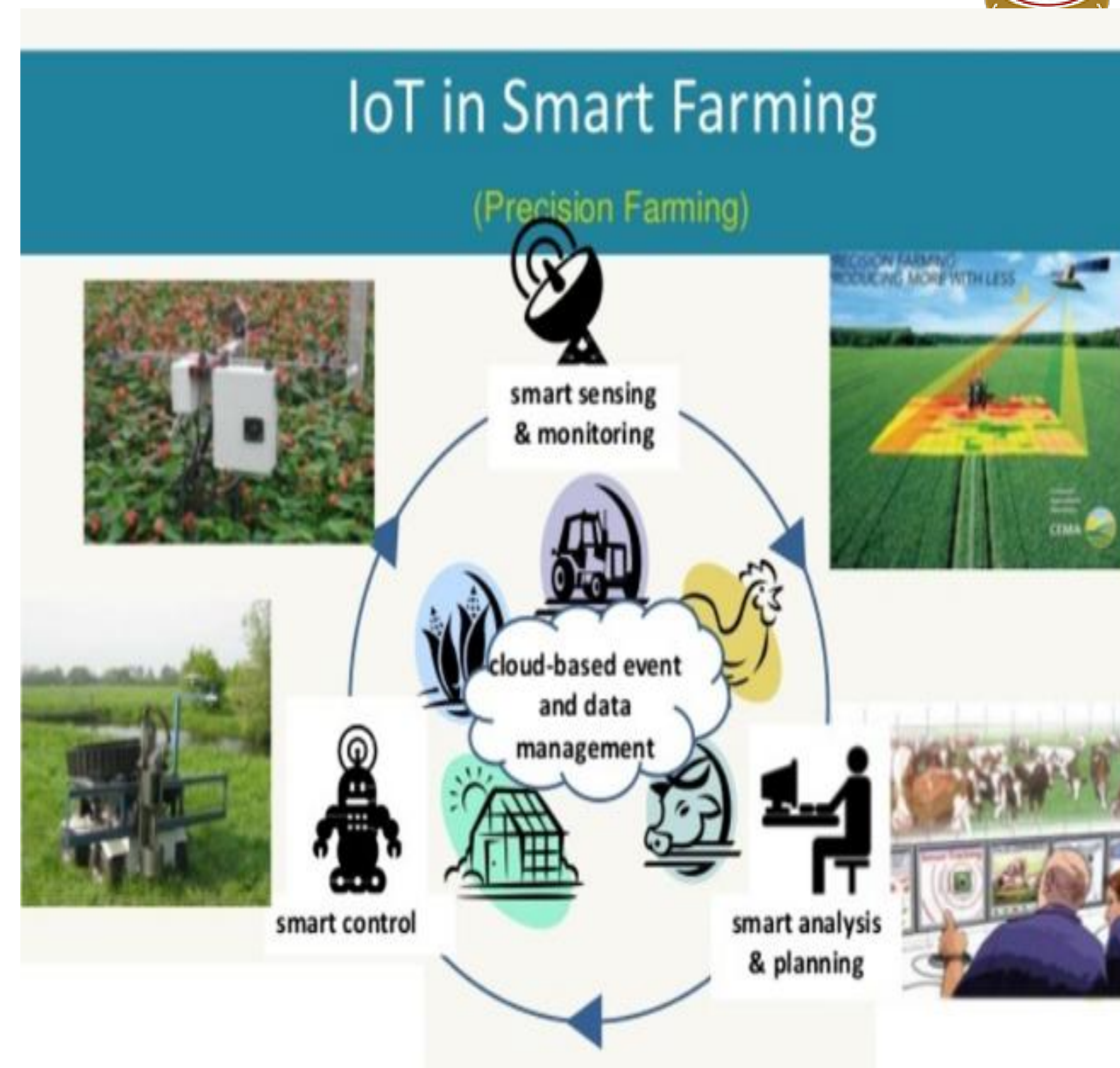
Data Flow Across Layers of IoT



IoT-based Smart Farming



Utilize wireless IoT applications to collect data regarding the irrigation of farm soil humidity Sensor and Soil Quality of farm land, and health of their crop using AI based Tools.
Application of Fertilizers using Drones and robots



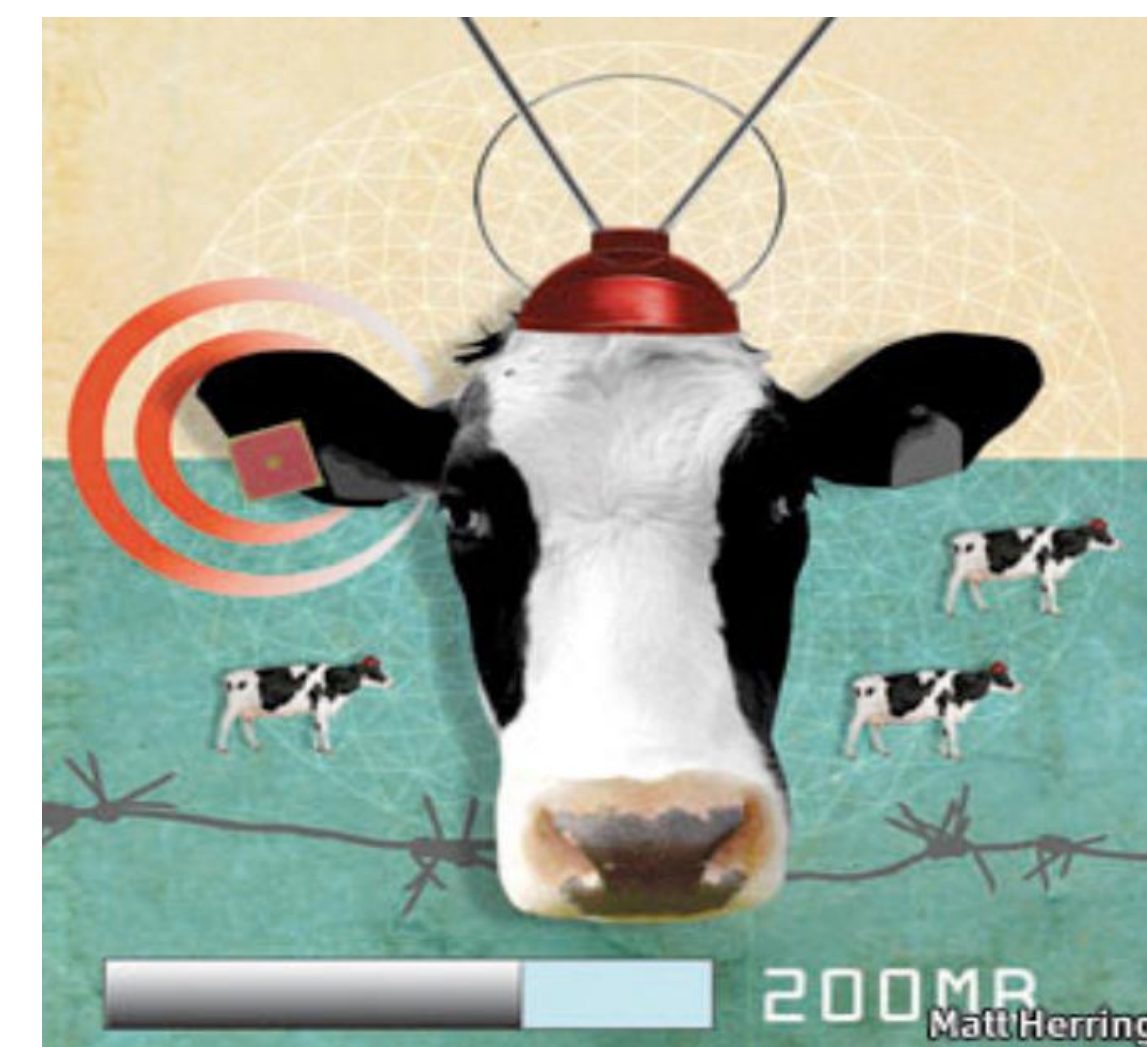
IoT-based Smart livestock



Utilize wireless IoT applications to collect data regarding the location, well-being, and health of their livestock

Monitor pregnant cows:

- Sensor powered by battery is expelled when its water breaks.
- This sends an information via the Internet to the rancher.



IoT for the Elderly



- With a built-in accelerometer that automatically detects falls
- Medication reminder
- With a GPS, which allows an emergency operator to locate and provide directions to the individual.

The HAPIfork is an electronic fork that helps you monitor and track your eating habits. It also alerts you with the help of indicator lights and gentle vibrations when you are eating too fast.



Smart Egg Tray

Egg Minder syncs with your smartphone to tell you how many eggs you've got at home (up to 14 eggs) and when they're going bad.

<http://www.quirky.com/shop/619>



IoT connected cars



iRA Connected Car Tech



REMOTE CONTROL

VEHICLE SECURITY

GAMIFICATION

LIVE VEHICLE DIAGNOSIS
& ALERTS

LOCATION BASED SERVICES

- GEO FENCING
- TIME FENCING ALERT
- VALET MODE
- SHARE LOCATION
- ROAD SIDE ASSISTANCE
- NEAREST SERVICE STATION

iRA Connected Car Tech



REMOTE CONTROL

VEHICLE SECURITY

- EMERGENCY SMS
- INTRUSION ALERT
- STOLEN VEHICLE TRACKING
- REMOTE IMMOBILISATION
- FIND MY CAR
- PANIC NOTIFICATION

iRA Connected Car Tech



REMOTE CONTROL

- LOCK / UNLOCK
- HEADLIGHTS ON / OFF
- HORN
- DISTANCE TO EMPTY CHECK (DTE)

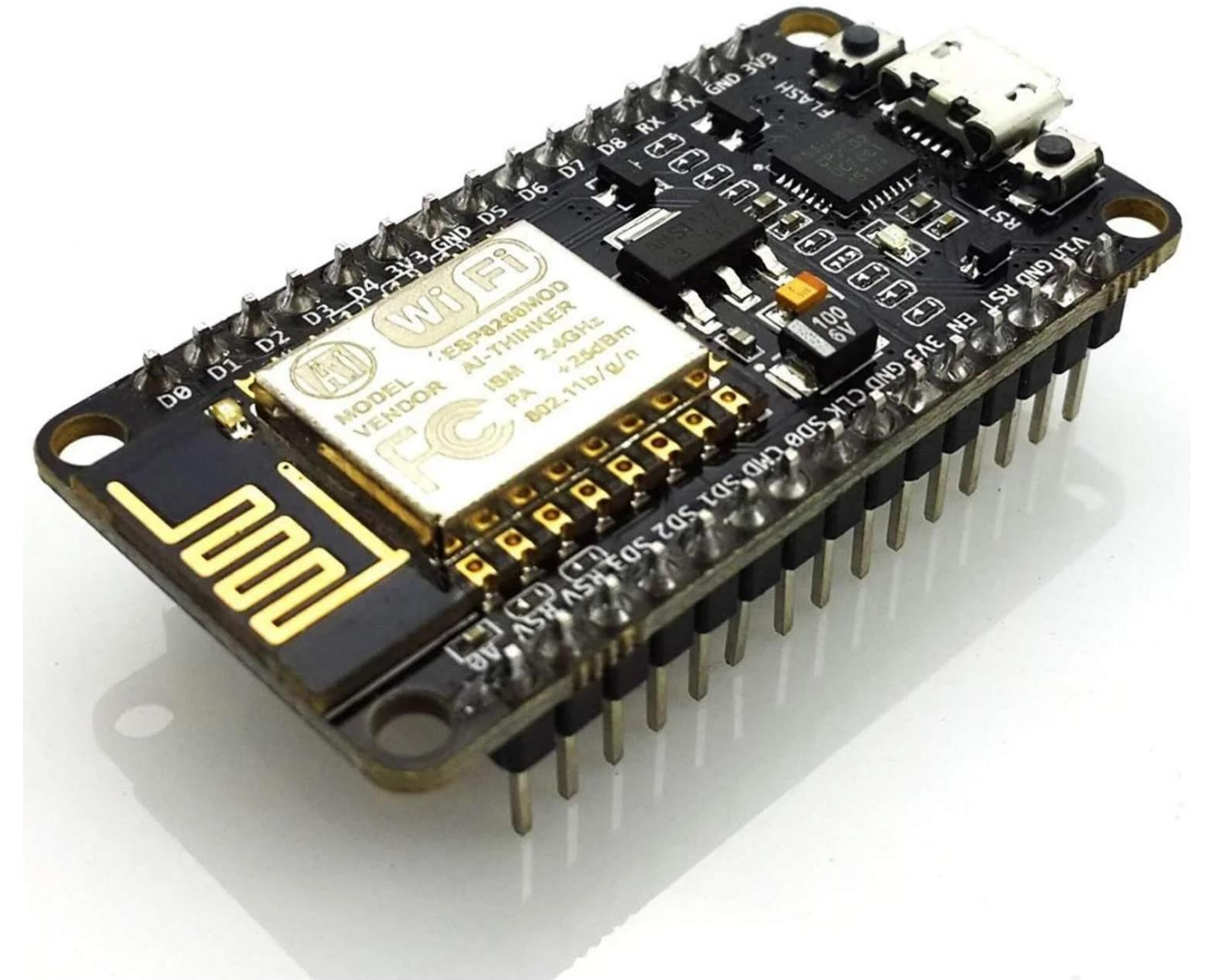
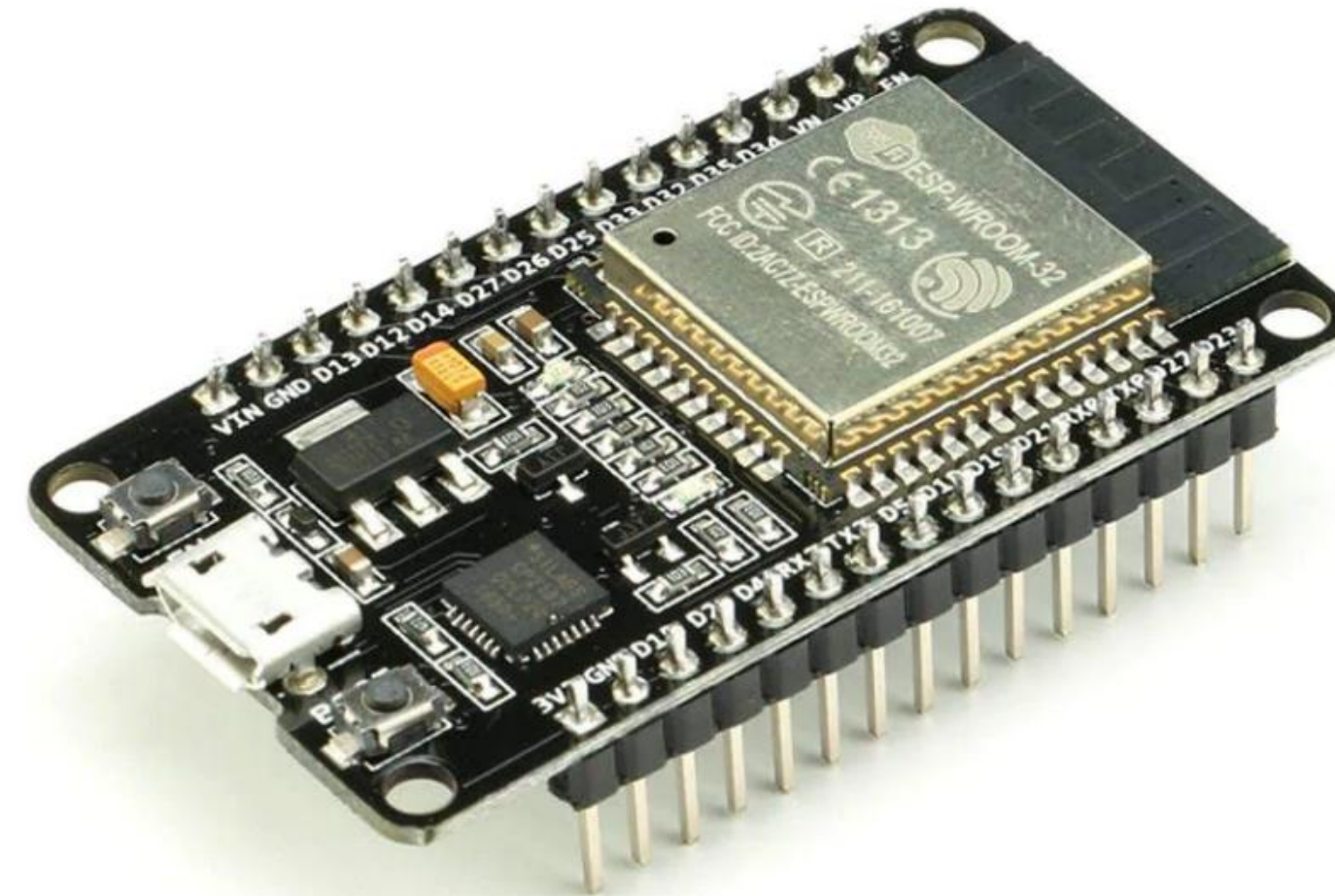
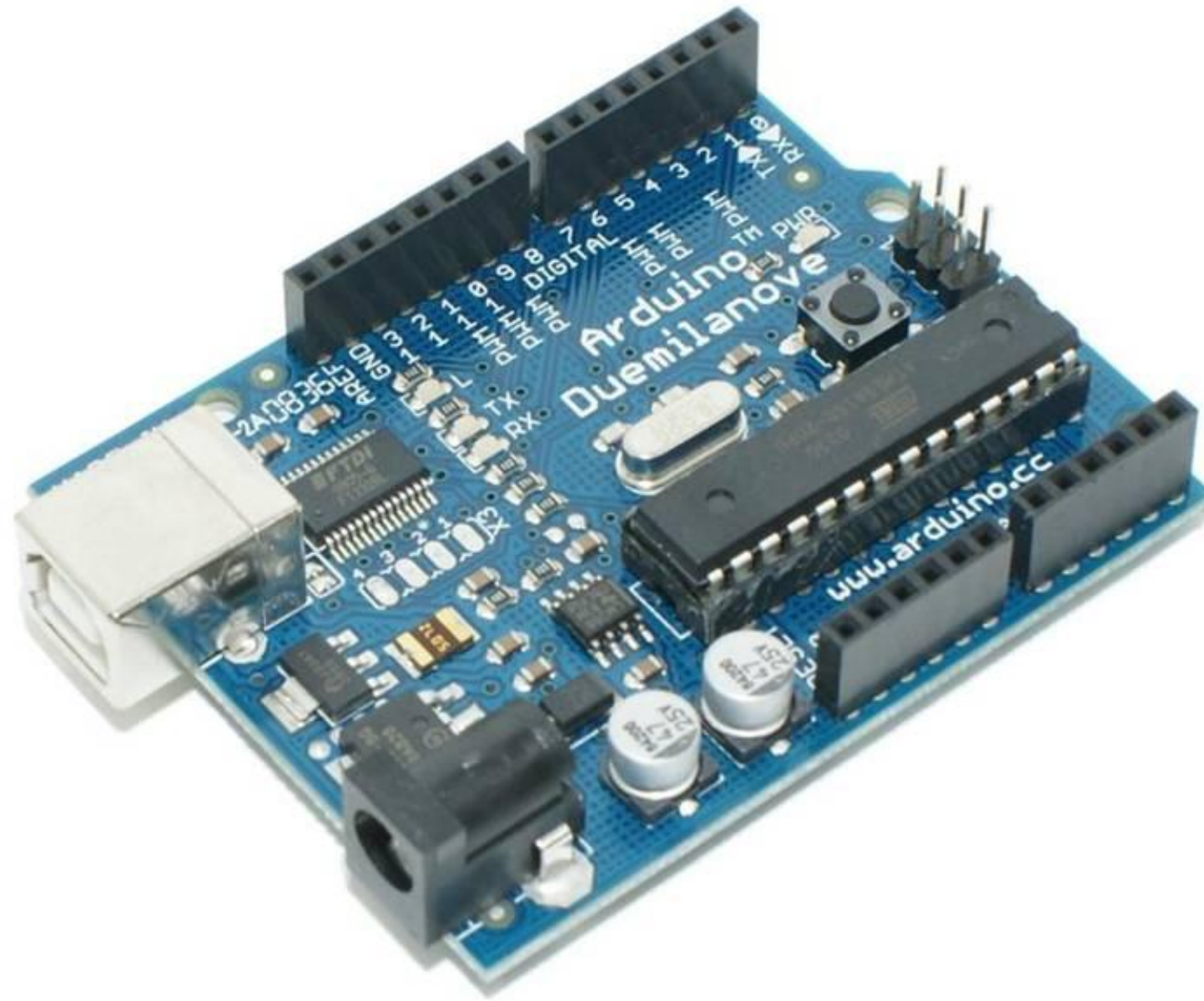
Hardware for IoT



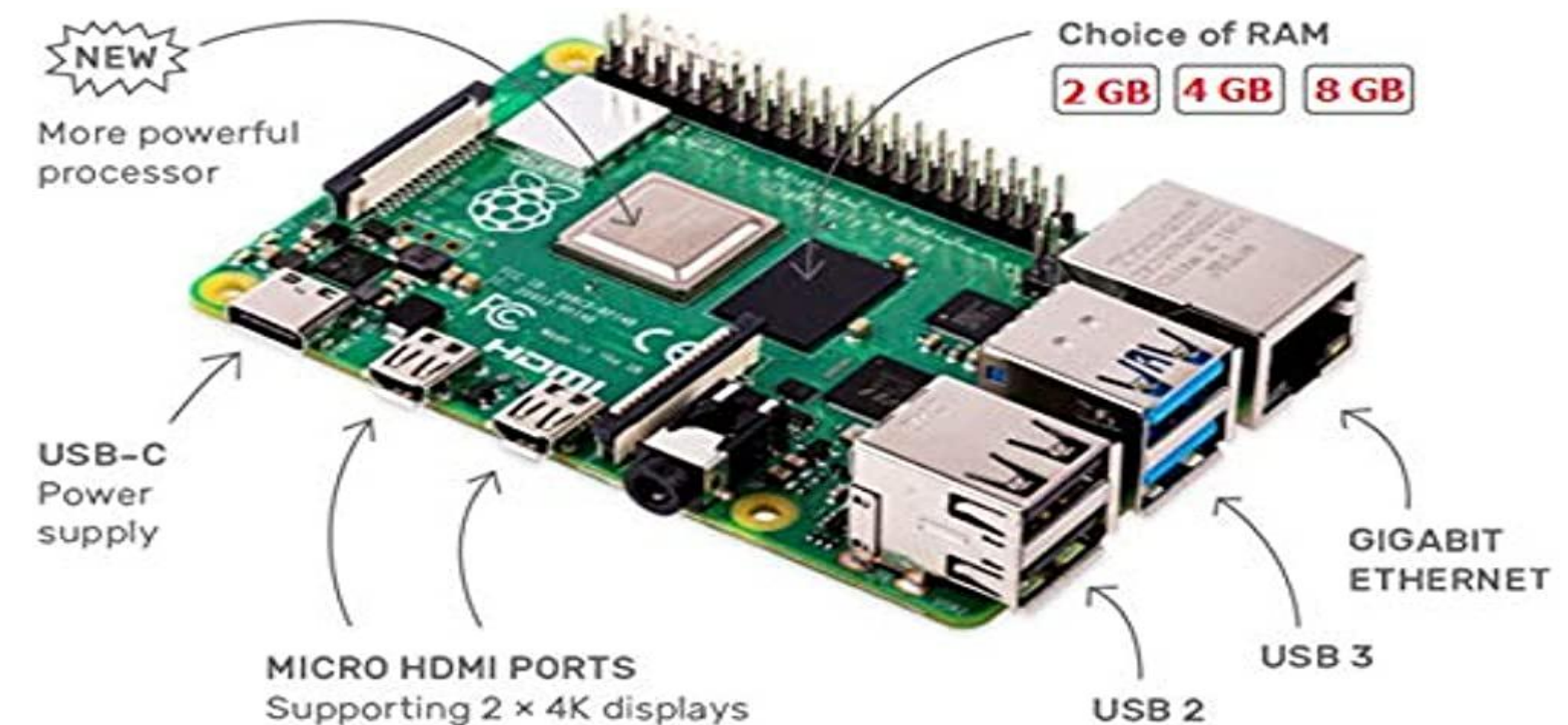
- Arduino UNO with ESP8266
- NodeMCU
- ESP32
- Wemos d1
- Raspberry Pi
- Beagle Bone Black
-and many more

Hardware for IoT

Microcontrollers

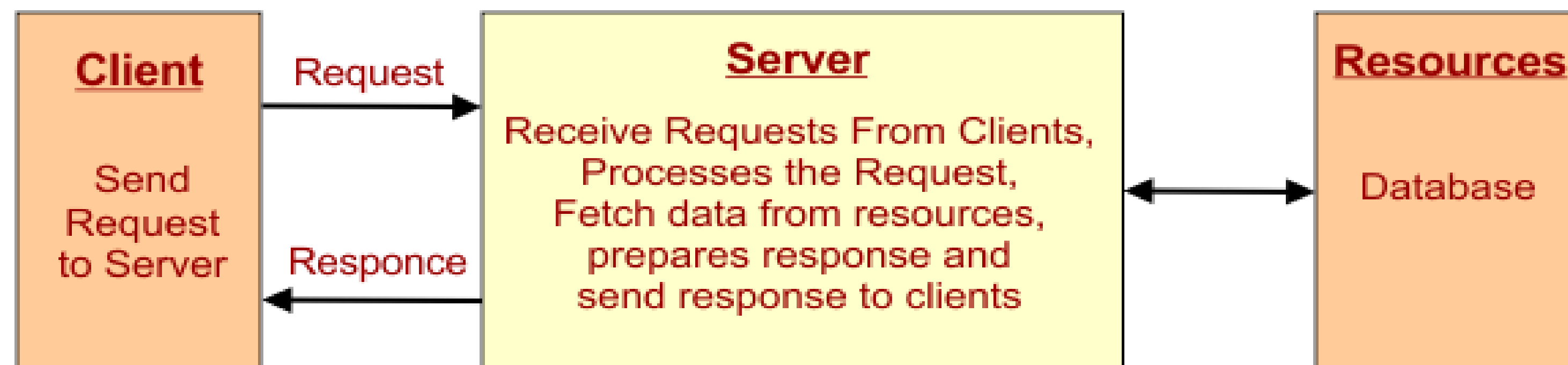


Single Board Computers



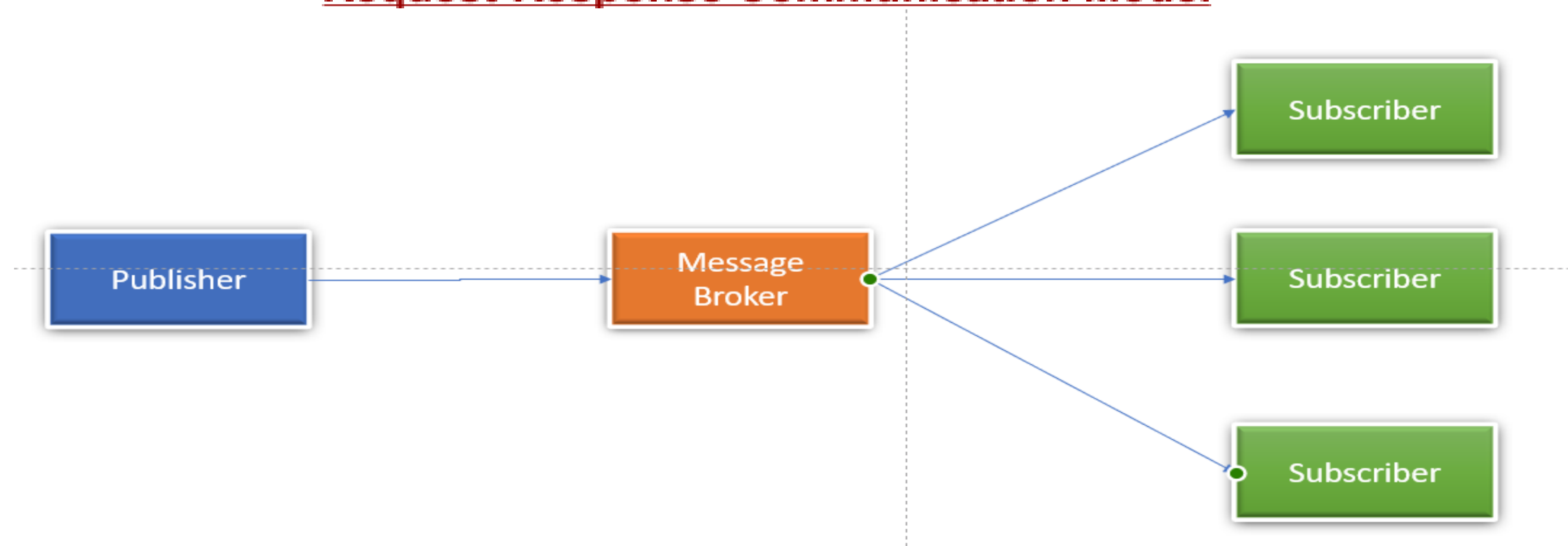
IoT communication modes

➤ Request and Response Model



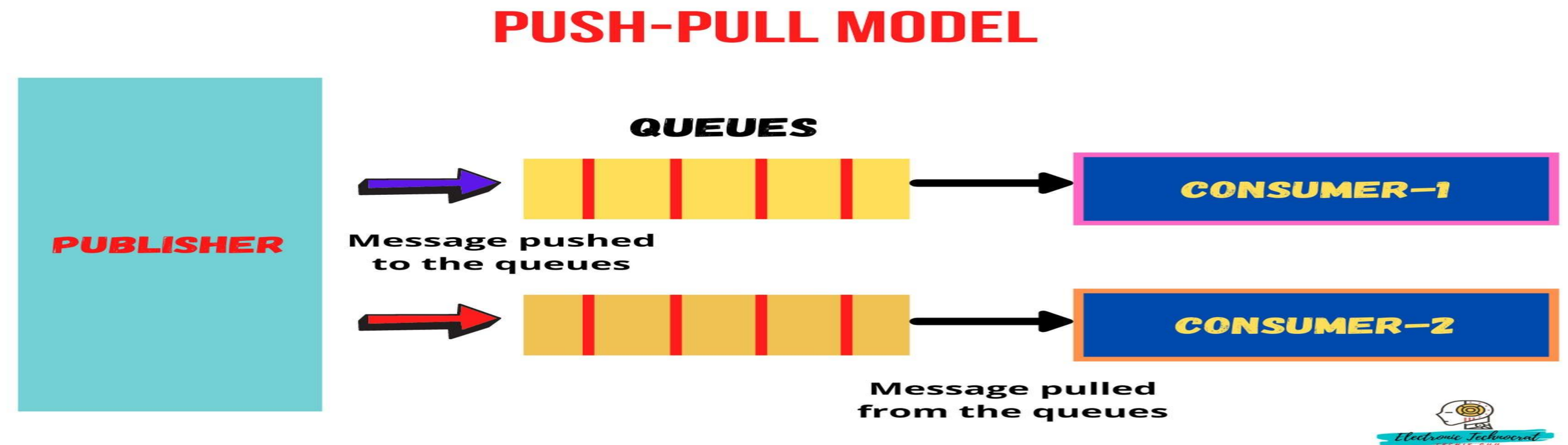
Request-Response Communication Model

➤ Publisher – Subscriber Model

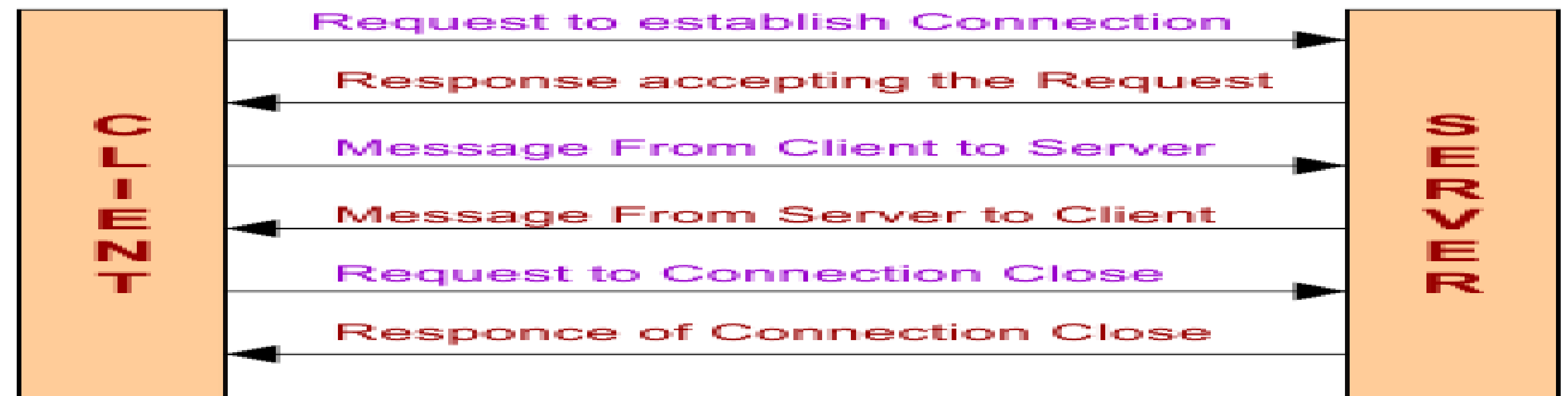


IoT communication modes

➤ Push Pull Model



➤ Exclusive Pair Model



Exclusive Pair Model

Network and Internet

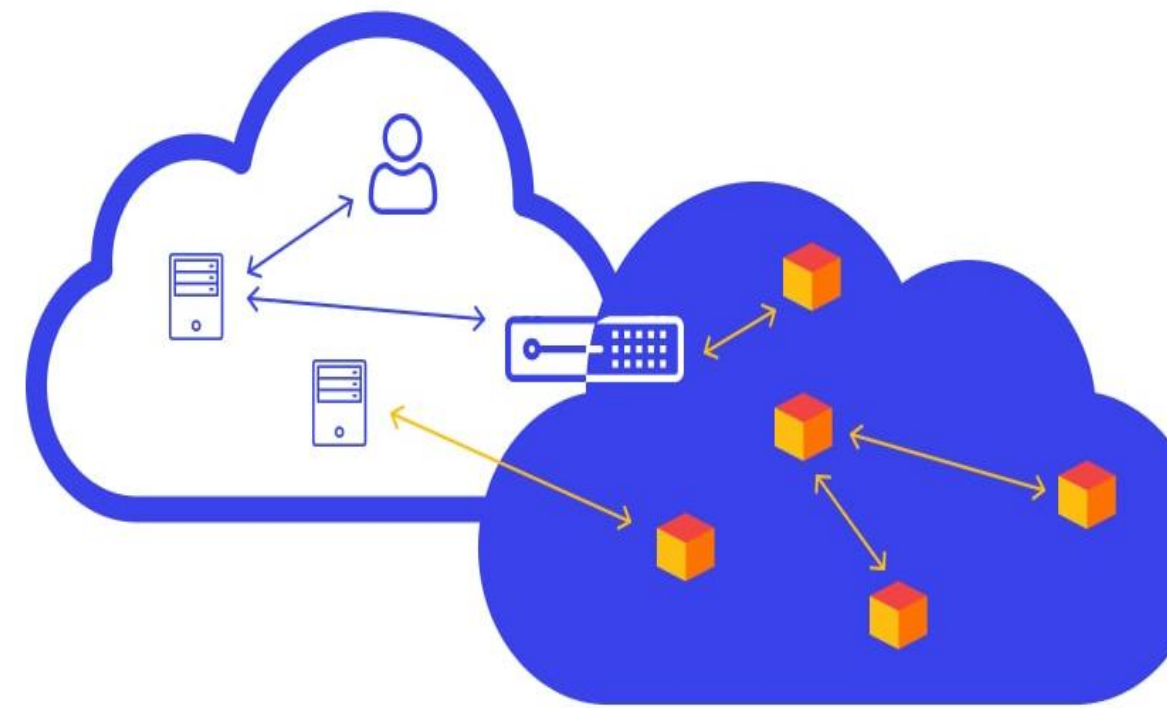


➤ Network Protocols

- CoAP
- MQTT
- HTTP
- XMPP
-
- Cloud
 - List is endless



Constrained Application Protocol



MQTT

HTTP

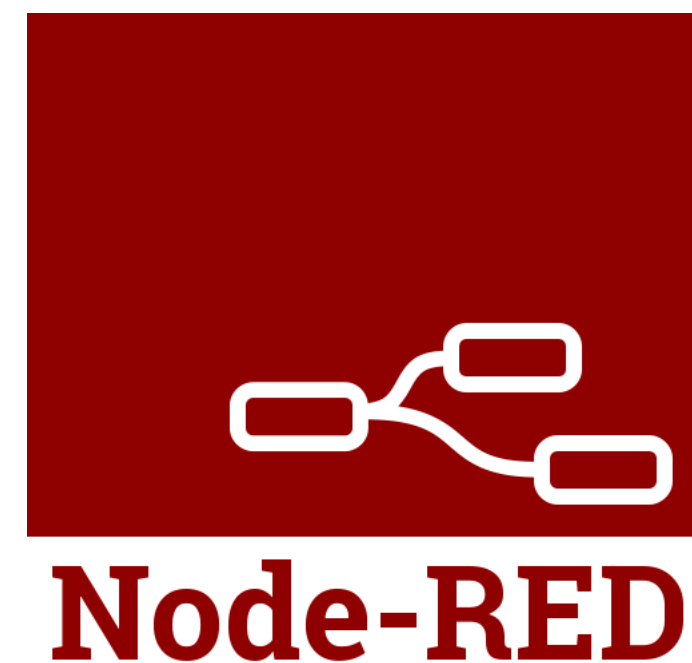
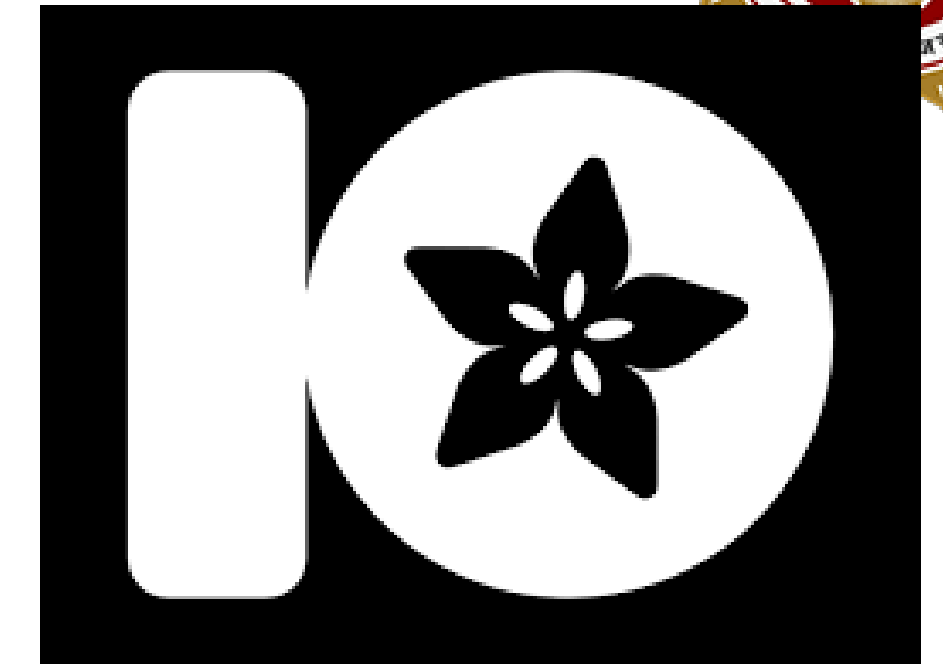


XMPP

Open source service provider



- Blynk 2.0
- Thingspeak
- Thinger.io
- Adafruit_io
- IFTTT
- Sinric Pro
- Arduino Cloud
- MQTT Service
- NodeRED by IBM
- Amazon Web Service (AWS) (Alexa)
-and many more



Criticisms and Controversies of IoT



Scholars and social observers and pessimists have doubts about the promises of the ubiquitous computing revolution, in the areas as:

- Privacy
- Security
- Lack of Government Initiative / Interest
- Design Complexity
- Environmental impact
- Influences human moral decision making / unemployment

Easily Accessible

- You may use the Internet of Things for various purposes, but the majority of them occur in real-time.
- All you need is an internet-connected smartphone. When these two are together, you and your life become smarter.





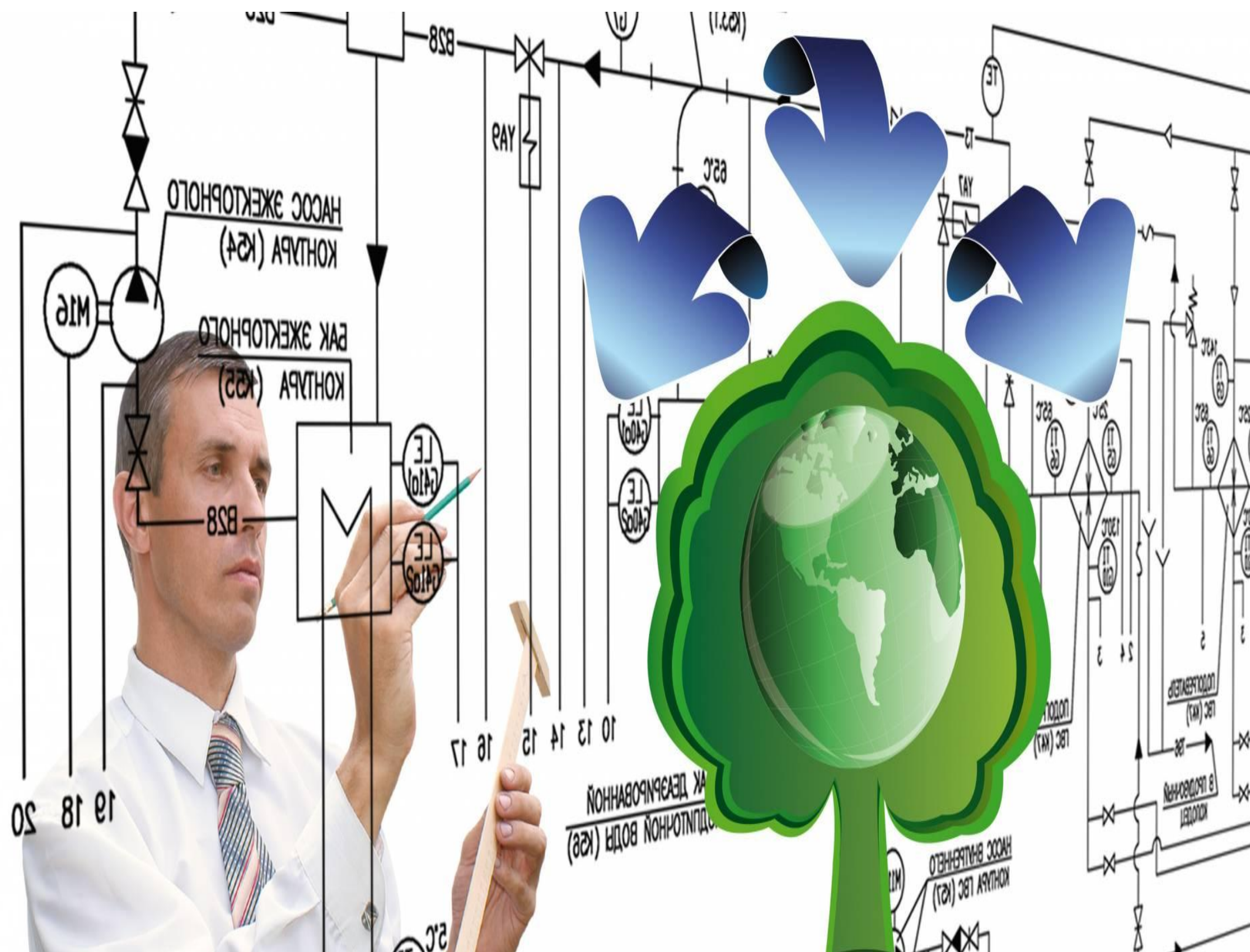
Technology Optimization

The same technologies and data which improve the customer experience also improve device use, and aid in more potent improvements to technology.

IoT unlocks a world of critical functional and field data.

Communication

- Better communication over a network of interconnected devices is conceivable, making it more visible and reducing inefficiencies. Machines must communicate with one another to be significantly more efficient and yield better faster outcomes.



IoT – Advantages



It saves money

- IoT allows electrical items to connect, conserving and saving money and energy properly.
- IoT improves the efficiency of our systems by allowing data to be exchanged and transferred across electronic devices and then translated into the format we want.



Security and privacy

- IoT creates an ecosystem of constantly connected devices communicating over networks. The system offers little control despite any security measures. This leaves users exposed to various kinds of attackers.



IoT – Disadvantages



Job Cuts

- The necessity for human labor will be greatly reduced when every task is mechanized. This will have an immediate effect on employability..

Complexity

- Some find IoT systems complicated in terms of design, deployment, and maintenance given their use of multiple technologies and a large set of new enabling technologies.



Dependability

- We may not see it, but we are experiencing a significant transition in technology and its use in our daily lives.



SUMMARY

Internet of Things
Only Tip of an Iceberg

THANK YOU!