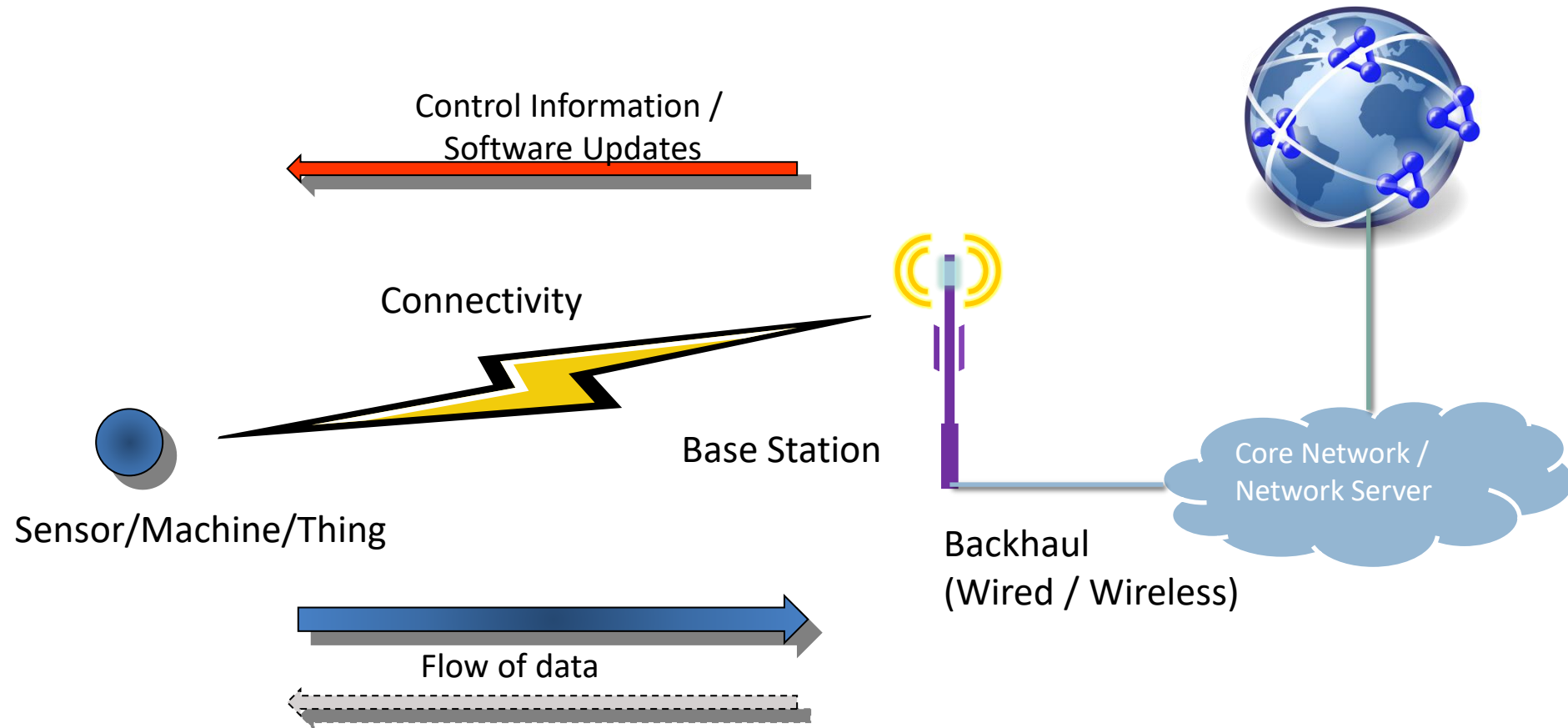


M2M, MTC & IoT



High Level Architecture of M2M/IoT



Sensors in your Device

Light

Proximity

Microphones (inc. ultrasound receiver)

Camera (front & back)

Gyroscope

Accelerometer

Magnetometer

Barometer

Humidity



Positioning

- GPS / GLONASS / GALILIEO
- Wi-Fi
- Cellular (A-GPS)

NFC

Pressure

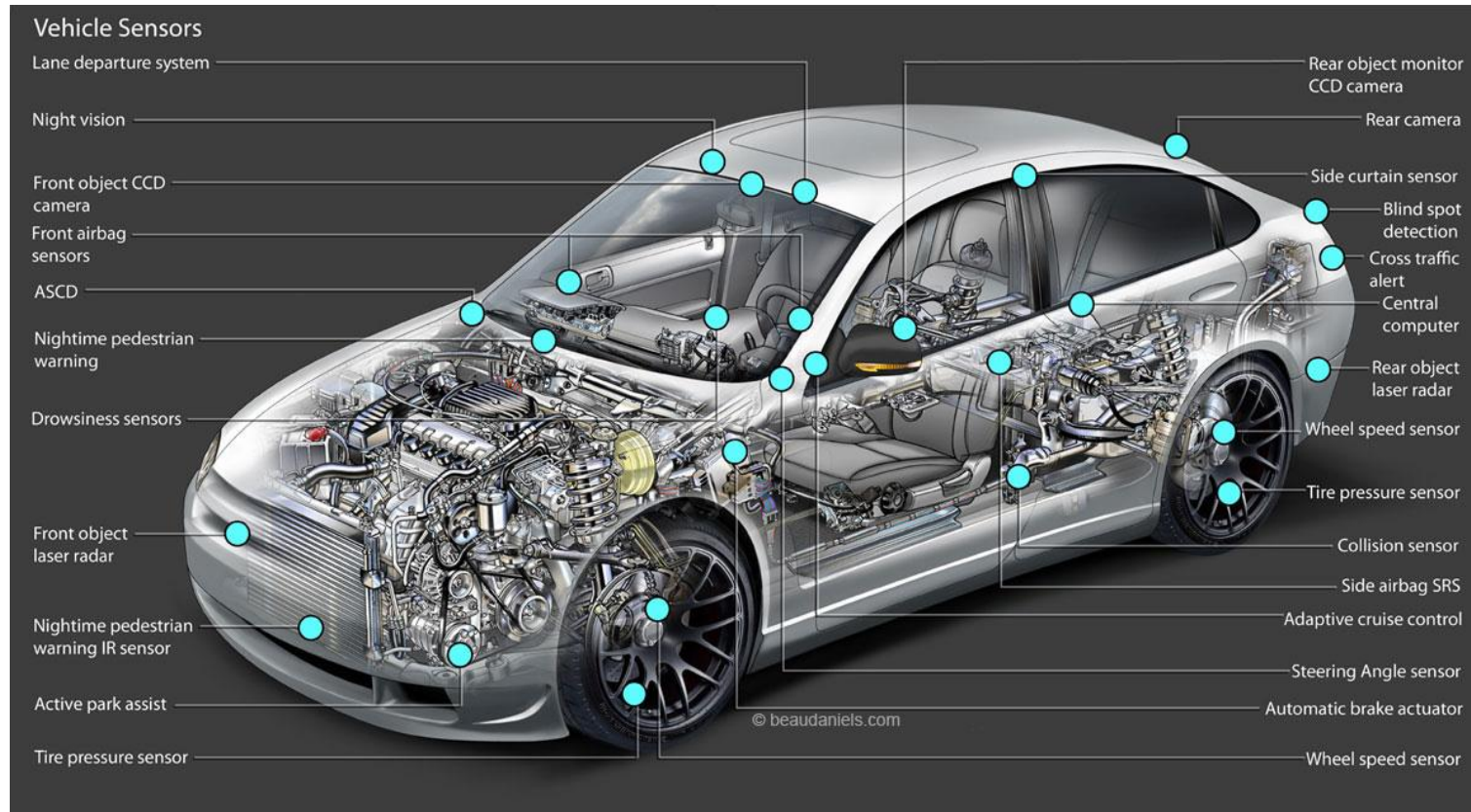
Temperature

Gesture

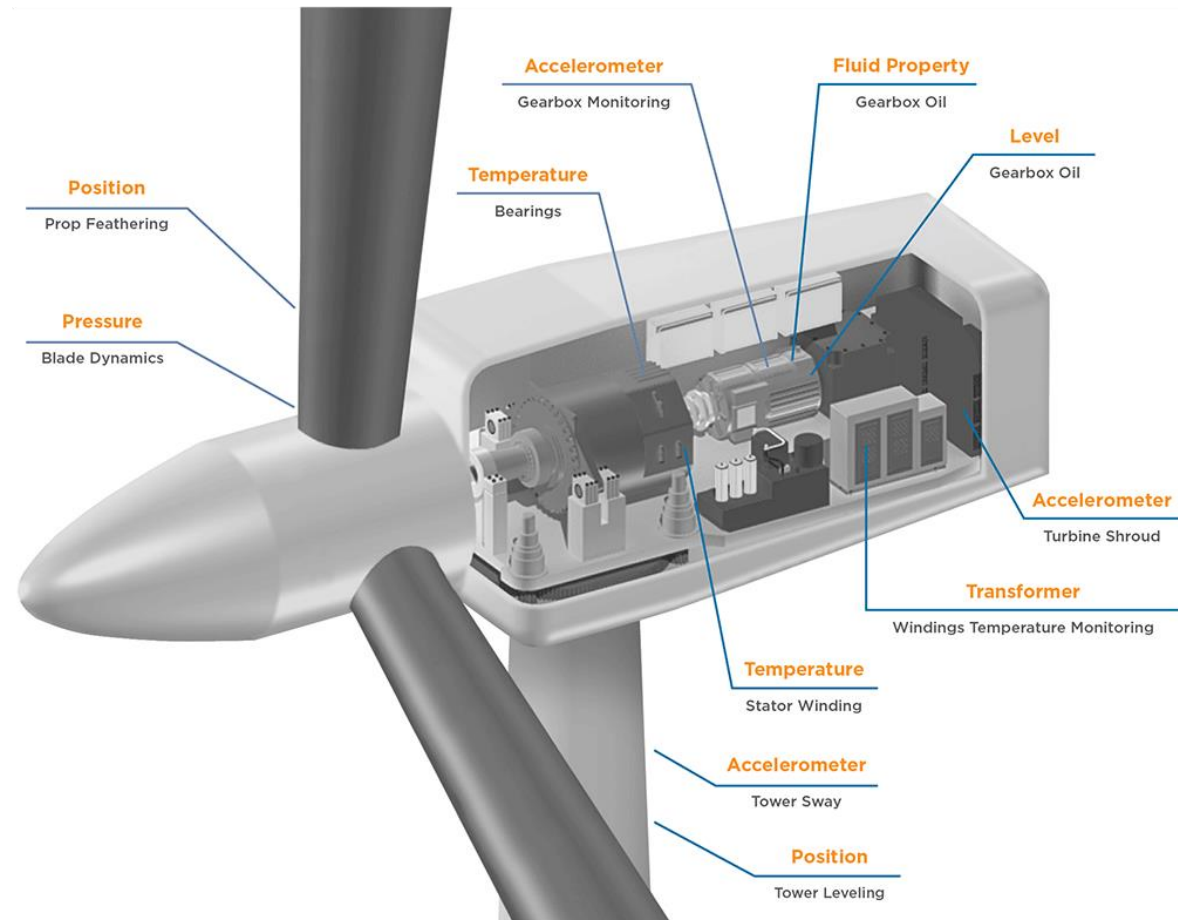
Fingerprint

Heartbeat monitor

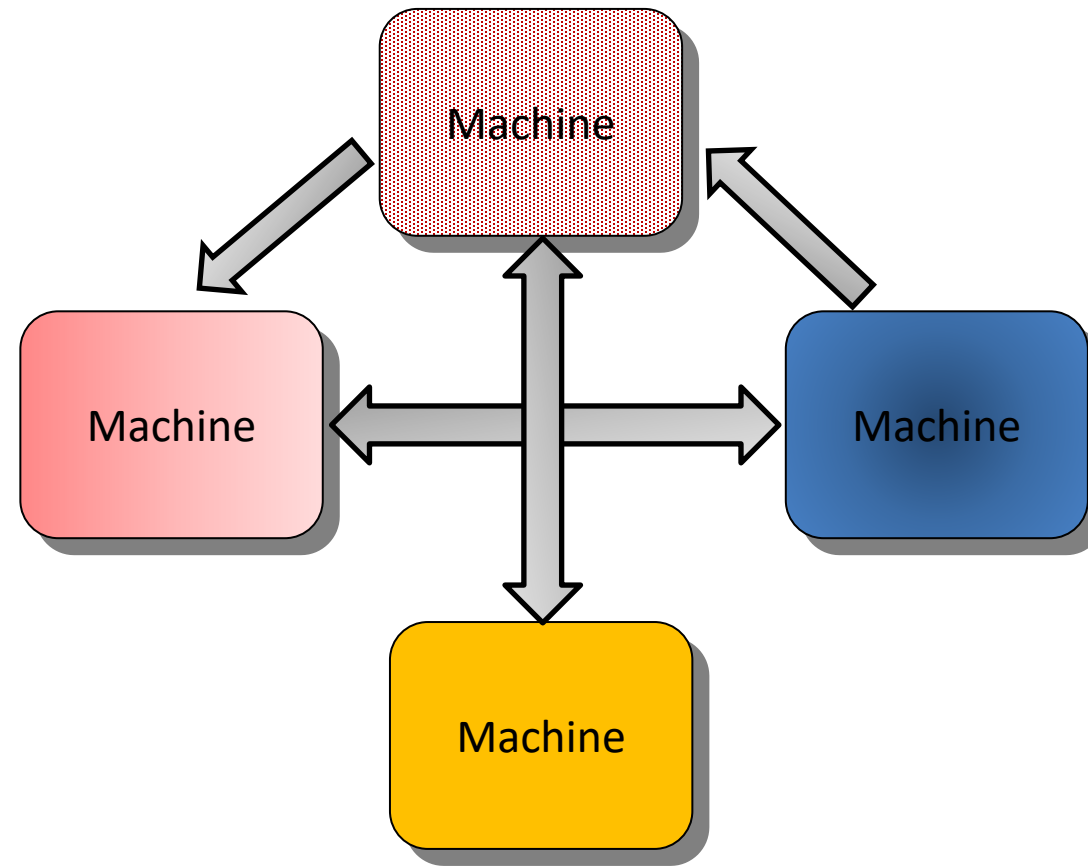
Sensors in your car



Sensors in Wind Turbines



Machine-to-Machine (M2M)



Machine-Type Communications (MTC)

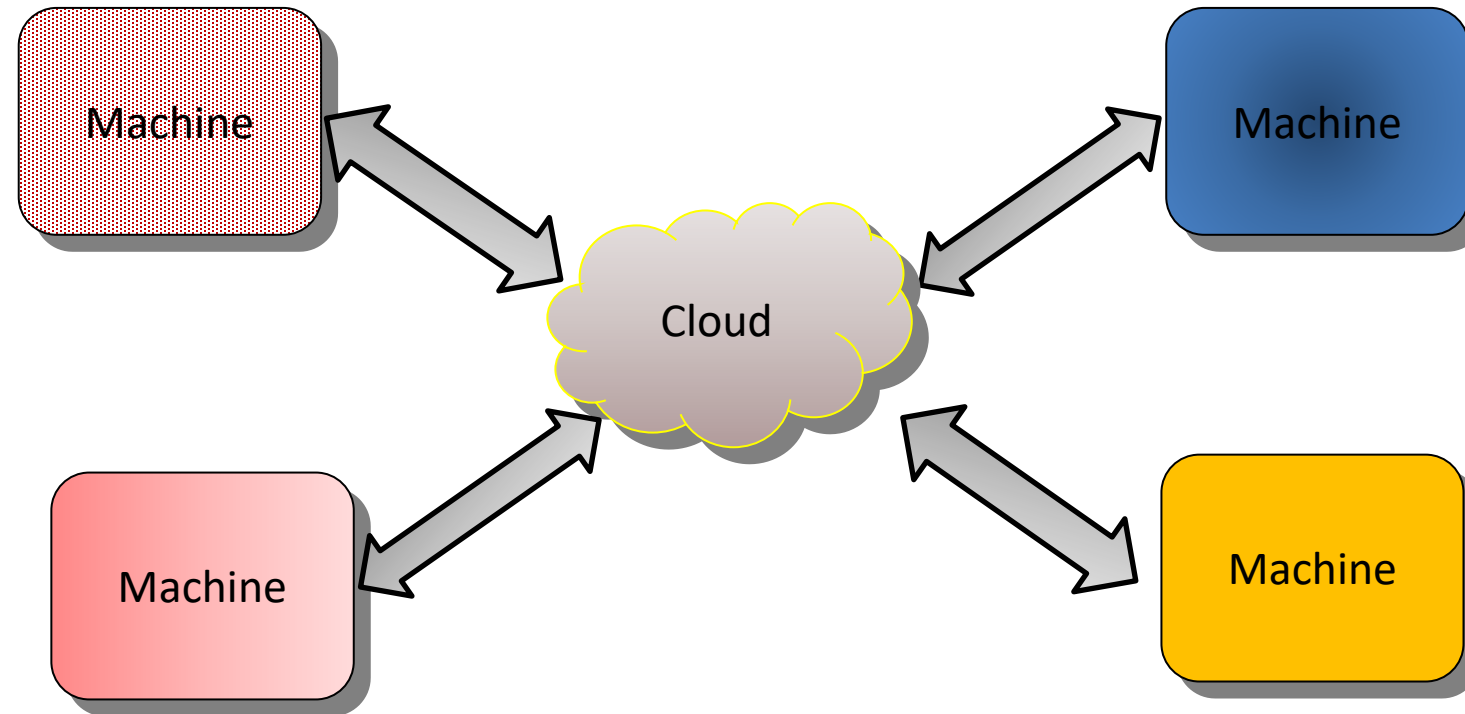
3GPP calls M2M as Machine-Type Communications (MTC).

3GPP started using MTC terminology from Release-10 onwards.

While 3GPP is also defining Narrowband IoT (NB-IoT), its still M2M/MTC.

One of the use cases for 5G is massive MTC (mMTC). The requirement is to handle 1 million devices / km²

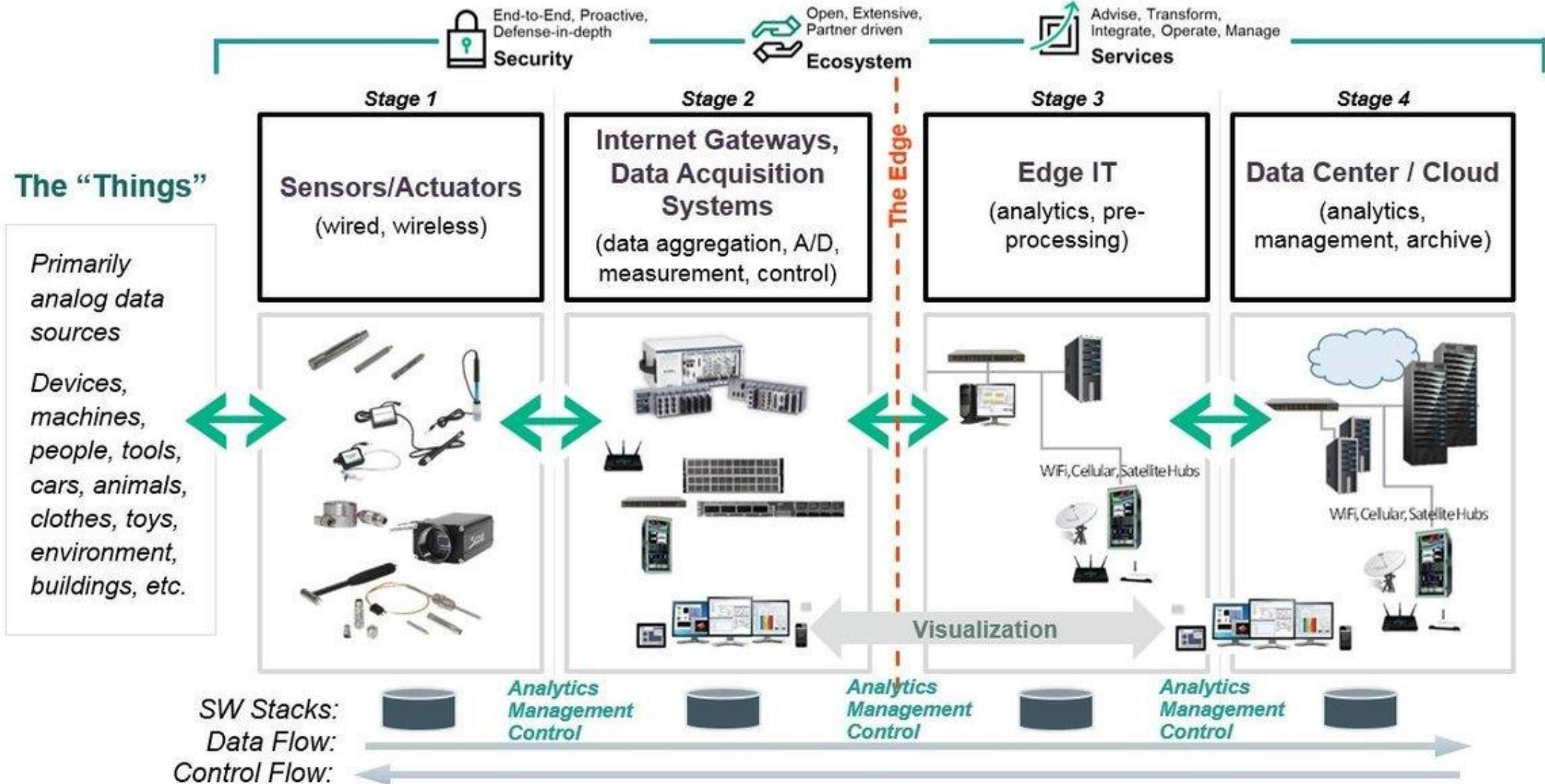
Internet of Things (IoT)



IoT: Simple Definition

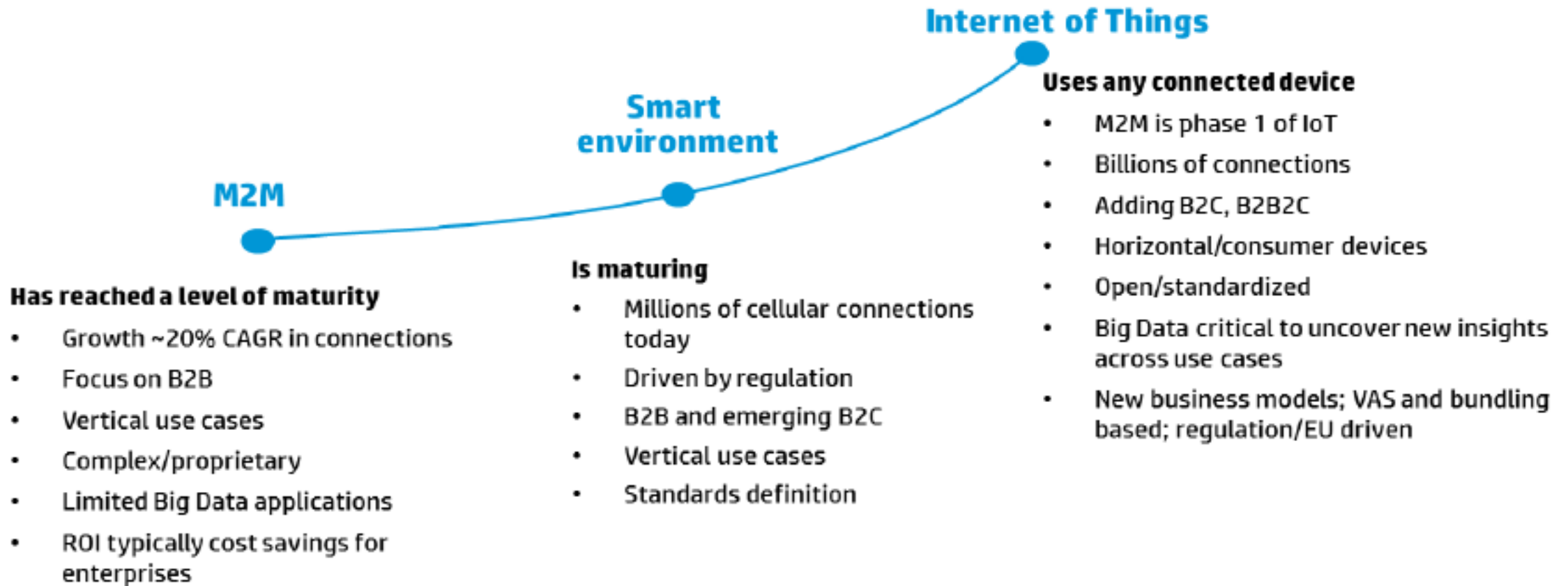
IoT is combining data, cloud, connectivity analytics and technology in a way that enables a smart environment in which everyday objects are embedded with network connectivity in order to improve functionality and interaction

The 4 Stage IoT Solutions Architecture



[Source](#)

M2M evolution to IoT



Source: 5G Americas

M2M vs IoT

Lets assume there is one of this machine on each floor or a five floor building

In total, there are five machines.

Source: [3G4G Blog](#)



M2M vs IoT

Scenario 1 - No connectivity

Someone has to manually go on each floor and check if there are enough coffee beans, chocolate powder, milk powder, etc.

He/She may have to do this say 3-4 times a day.



Source: [3G4G Blog](#)

M2M vs IoT

Scenario 2 - Basic connectivity (M2M)

The machine has basic sensors so it can send some kind of notification (on your phone or email or message, etc.) whenever the coffee beans, chocolate powder, milk powder, etc., falls below a certain level.

An app on phone and/or computer may be available



Source: [3G4G Blog](#)

M2M vs IoT

Scenario 3: Advanced connectivity (IoT)

Lets say that the coffee machine is connected to the office system and database.

It knows which employees come when and what is their coffee/drinks consumption pattern

This way the machine can optimize when it needs to be topped up.

If there is a large meeting/event going on, the coffee machine can even check before the breaks and indicate in advance that it needs topping up



Source: [3G4G Blog](#)

M2M vs IoT

Scenario 4: Intelligent Devices (Advanced IoT)

Lets add intelligence to it so it can even know about the inventory.

How much of coffee beans, chocolate powder, milk powder, etc is in stock and when would they need ordering again.

It can have an employee UI (User Interface) that can be used by employees to give feedback on which coffee beans are more/less popular or what drinks are popular.



Source: [3G4G Blog](#)

M2M vs IoT

Scenario 4: Intelligent Devices (Advanced IoT) – continued

This info can be used by the machines to order the supplies, taking into account the price, availability, etc.

Build your own apps – API's are available

Can robots automate the remaining tasks of cleaning, topping it up, etc.?



Source: [3G4G Blog](#)

M2M evolution to IoT

M2M Evolution to IoT

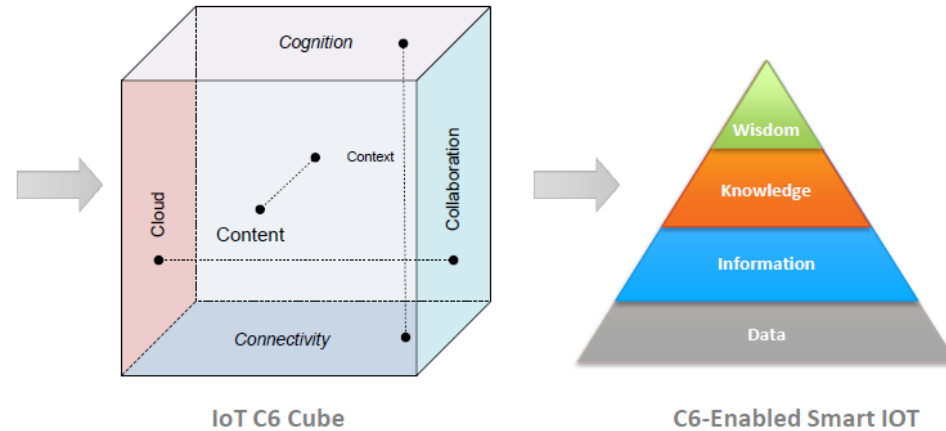
M2M is communication among machines to manipulate content/data

Current M2M

- **Connectivity:** connection for machines;
- **Content:** massive raw data from things;

Evolution to IoT

- **Cloud:** cloud service and XaaS for IoT;
- **Context:** context-aware design;
- **Collaboration:** collaborative services;
- **Cognition:** semantics and autonomous system adjustment



IoT is communication to/from things which offer new services via cloud/context/collaboration/cognition technologies

M2M Service Platform → IoT Service Platform with C6 Capabilities

Thank You

To learn more, visit:

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