#WeAreConnectivity

SMART SOLUTIONS FOR A CHANGING WORLD

Cervello

The Smart World Maker and Enabler

Cloud platform for IoT applications

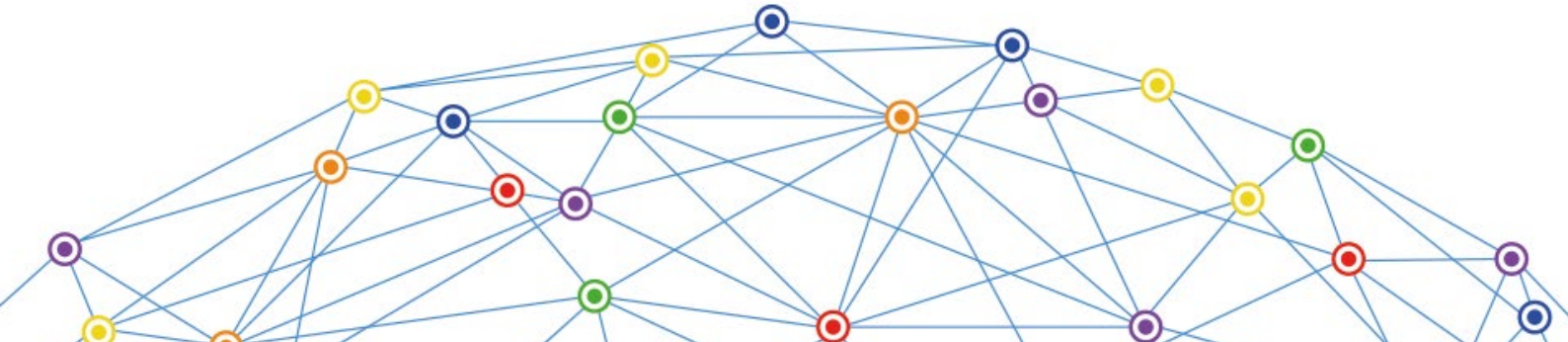
developed by

IOTBLUE

WHITEPAPER

Based on a seminar
by Matrix on February 2018

www.matrix.es
www.iotblue.net



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WHAT IS IoT

Since Internet came into existence, infinite connectivity solutions have been created and improved. Some people think the beginnings of IoT (Internet of Things) were in 1990, when John Romkey and Simon Hacket were able to connect a toaster to the Internet, and controlled it remotely, being able to determine the toasting time.

In a nutshell, Internet of Things is a network that hosts different kinds of electronic devices that can be connected between them, allowing for remote control, and making the logistics and managing of our everyday life easier. This technology is used to allow people and things to share data and connect with each other. This data can be processed to get important information and knowledge that allows us to automatize management. This knowledge also allows to create a sustainability socially, economically and environmentally.

From that toaster, IoT has developed quickly, and previsions show it will continue to do so. This will open up a world of connectivity full of possibilities, from turning on the heating system in our homes remotely, to managing the traffic of a whole city.

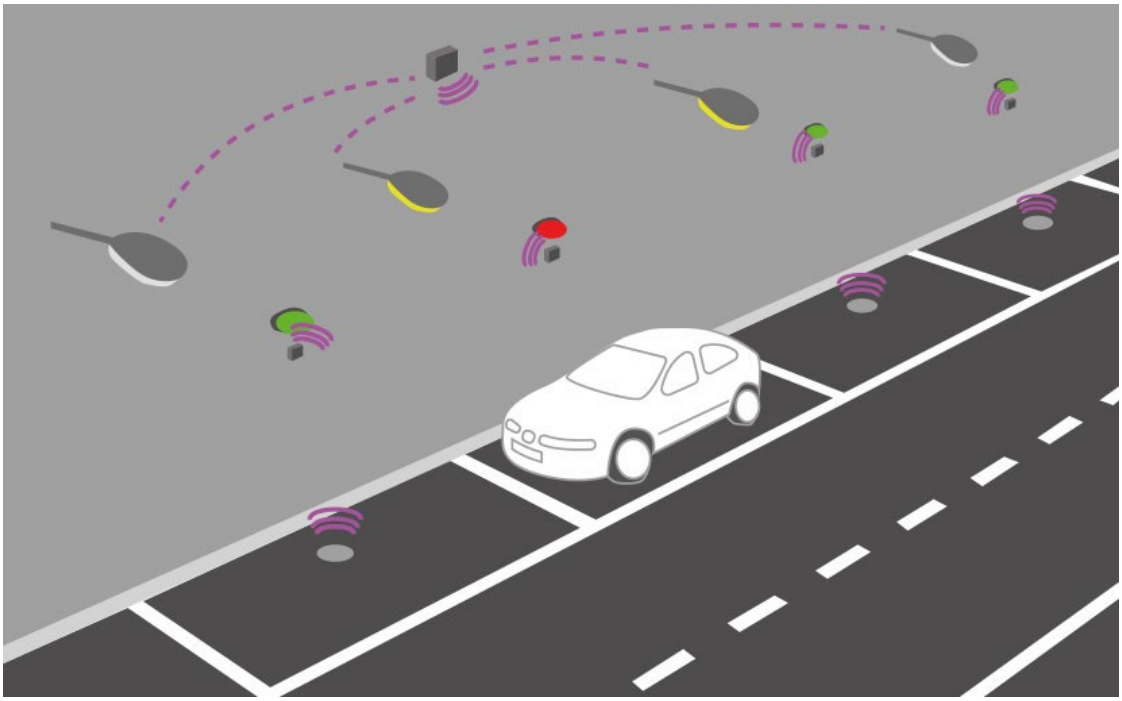
Source: Dr. Mazlan Abbas 2017
Symposium on Manufacturing with Nanotechnology - Towards Industry 4.0 (2017)

IoT vs M2M

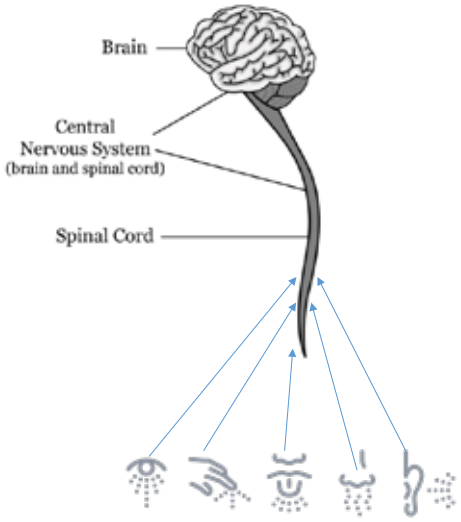
The terms IoT (Internet of Things) and M2M (machine to machine) are used indistinctively many times, but there are some differences between them.

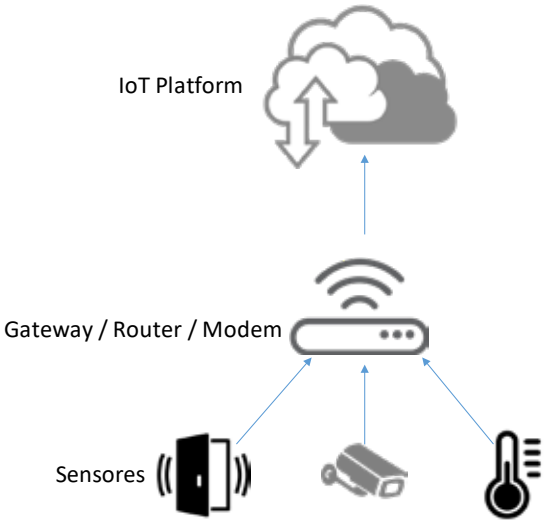
The most significant difference is the Internet connectivity. In the case of M2M, devices are not necessarily connected to the Internet. However, in the case of IoT, devices always need to be connected to the Internet.

Another important difference is the integration capacity. In the case of M2M, the integration capacity is very limited, since all devices need to meet the same standards. On the contrary, in the case of IoT, the integration capacity is unlimited, through middleware.



HOW DOES IoT WORK





To better understand how does IoT work and the place of Cervello in this picture, we are comparing a connectivity solution with human central nervous system.

Within our nervous system, our five senses send sensory information through the spinal cord to the brain, which interprets the received data. That is also how a connectivity solution works, where sensors gather information that they send through a connectivity device to a cloud platform, which organizes that information. Cervello would act as the “brain.”

Connectivity solutions face many challenges. Some of them are:

Security and privacy:

- Security networks
- Cyphered data life cycle
- Firmware updates in field (OTA)
- Autentication and people & device authorization
- Gathered data registry and follow-up

Communications:

- Old protocols or owners
- Open source protocols
- Message different formats

Complexity:

- Management of millions of connections
- Infrastructure and services high availability
- Processing and storing of large volumes of data
- Business alarms and rules

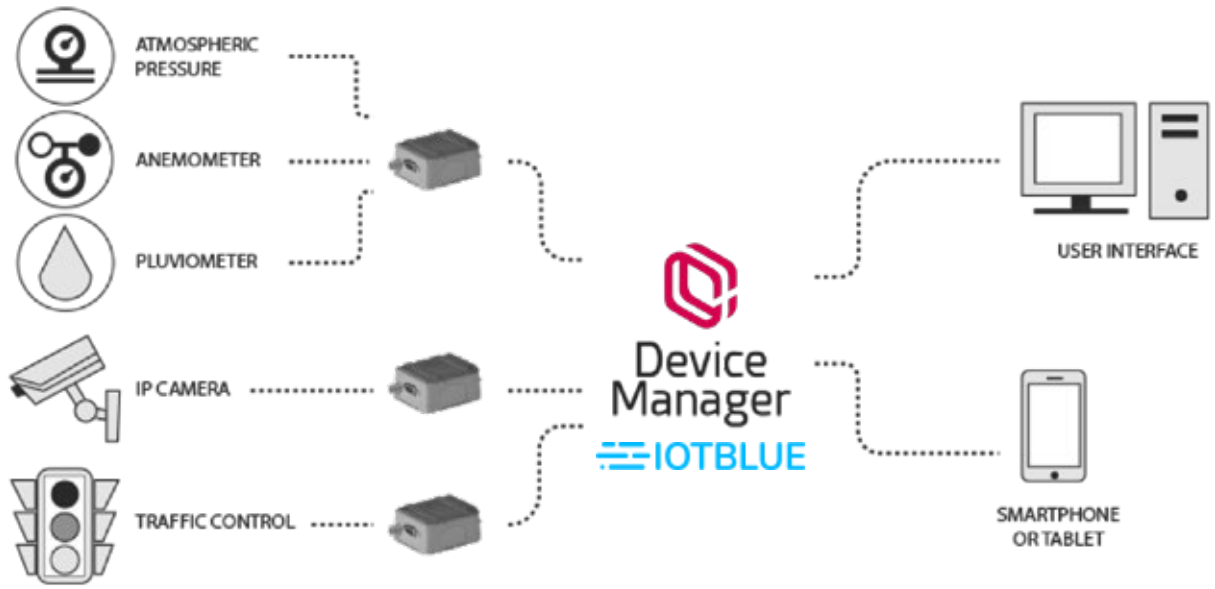
WHAT IS CERVELLO

Developed by IoTBlue, Cervello is a is a multitenant cloud platform that allows you to connect any IoT device with a web platform for easy control and management.

This platform is a Software as a Service (Saas) cloud solution to manage and monitor remotely IoT and M2M devices with infinite possibilities: gathering big data, remote control, traffic management, metering, etc.

Cervello allows for an easy integration, and makes managing infrastructures easy, allowing the user to focus on their business. That way, without the need of a development team of your own, costs and risks are reduced, as well as time to market. It also can be scalated as the business grows, and pay only for what it is used.

The following use example illustrates its functioning withing a smart city, where Cervello controls and measures several devices through modems connected to Cervello Device Manager, which receives sensor data in real time, and is able to control said devices remotely, control the traffic, etc.



FUNCTIONALITIES

Privisioning and authentication
Controlling, monitoring and provisioning devices securely via APIs.

Collecting and storing telemetry data
Storing and collecting telemetry data securely. Accessing collected data via customizable web dashboards or server API.

Processing and action
Defining data processing rules like agreggation, transformation, classification, etc. All of that in real time so the user can activate work and app flows later.

Work and app flow design
Designing its application logic. Sending data to external systems or alarm activation and defined rules. Increasing server funcions or sending commands to the devices.

Visualizing and analyzing data
Providing completely configurable widgets. Line graphics, digital and analog meters, maps and much more incorporated. Creating dashboards and sharing it with customers.

Remote control
Controlling devices remotely through the dashbord or API. Sending RPC commands to devices and viceversa.

IoT gateway
Integrating devices connected to installed systems using existent protocols. Connecting to OPC-UA or MQTT broker in minutes.

Device management
Providing the ability to register and manage devices. Allowing to control on customer's side and to provide server device attributes.

Multitenant
A user can have several administrators as well as millions of customers and devices.

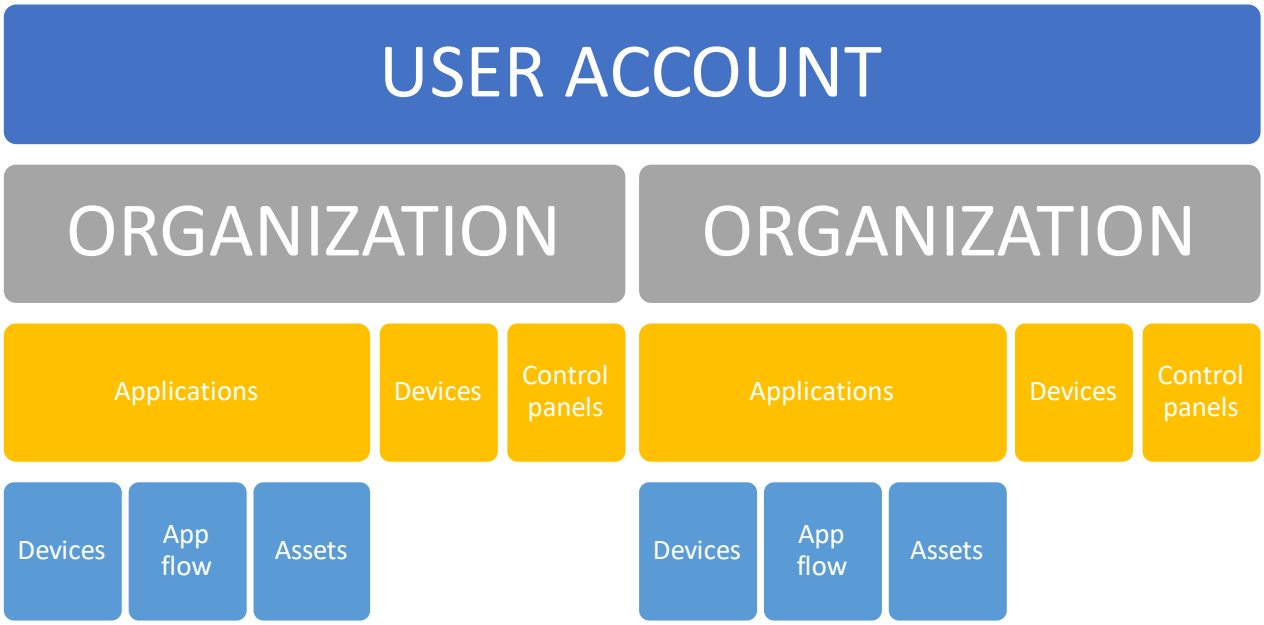
Horizontal scalability
The applications ammount and server supported devices increases linearly as new Cervello servers are added. There is no inactivity time, the server does not restart nor do application errors pop up.

Fault tolerant
All Cervello servers are identical. There are no master or waiting servers. Node fault is automatically detected. Fault nodes can be replaced without inactivity time. Persistent data are replicated using a high availability NoSQL data base.

Security
Supporting transport encryption for MQTT and HTTP(s) protocols. Supporting devices authentication and managing devices credentials.

Personalization and integration
Increasing the functionality of the predetermined platform through customizable implementations, widgets and transport. As well as MQTT, CoAP and HTTP support, Cervello users can use their own transport implementations or personalize the behaviour of existing protocols.

USER HIERARCHY



Cervello user hierarchy from above, starts with a user account encompassing all remaining accounts.

Within the user account there are the different customers (organization) accounts, that function completely separate. At the same time, each customer has their own applications, devices and dashboards.

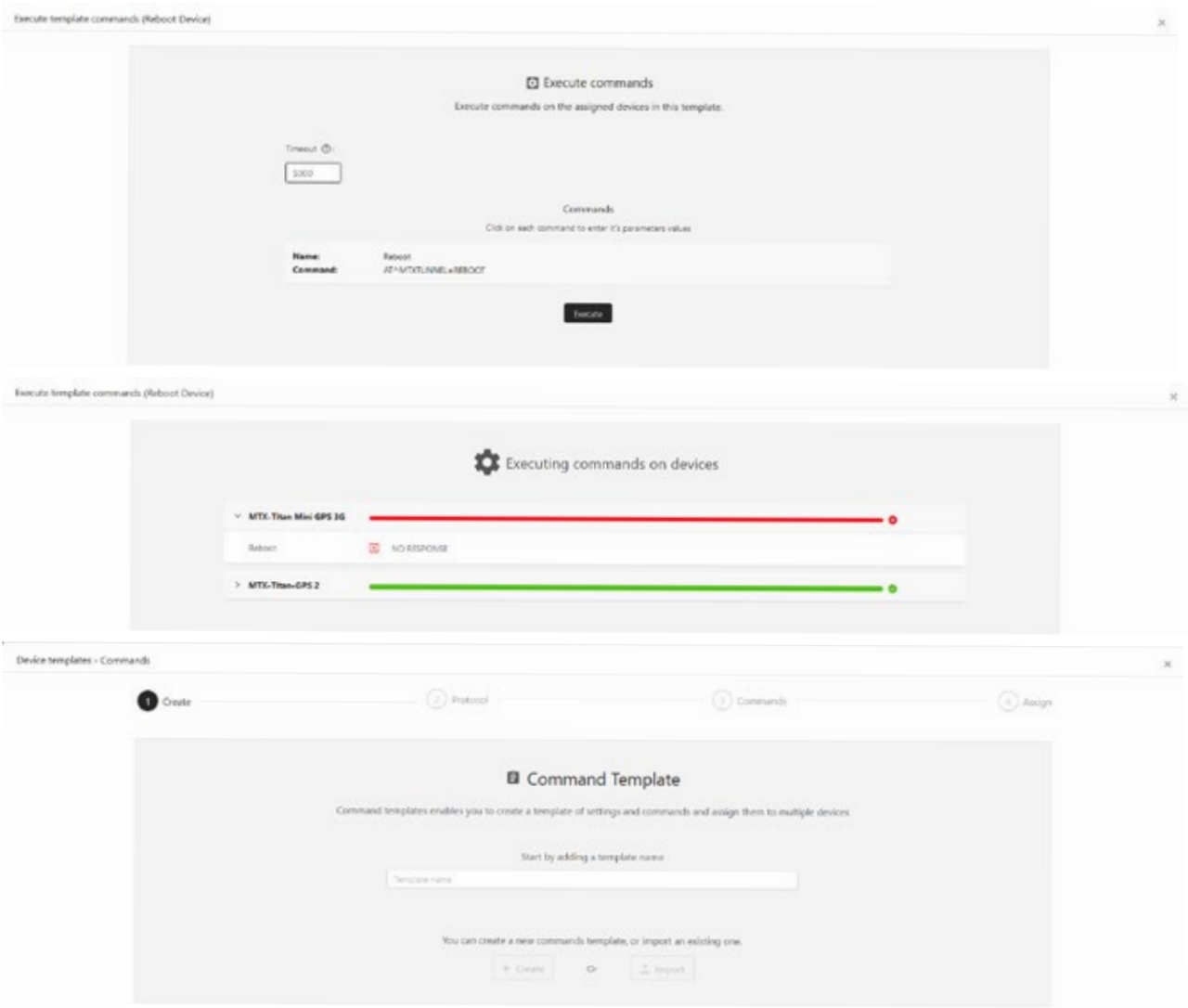
Every application of each customer has their own devices, app flow and assets. Devices can function assigned each to its related applications, or associated to several applications at the same time, allowint to use one device as data source for more than one application.

IoT ECOSYSTEM

Device Manager

Cervello Device Manager is where the user manages and controls all their devices:

- Attributes
- Last telemetry
- Assigned applications
- Associated commands
- Customized commands template creation
- Executing commands individually
- Executing commands by batches
- Etc.



Dashboard Manager

The Dashboard Manager is where the user designs their control panel dragging and dropping.

From the Dashboard Manager the user can:

- Personalize the control panel
- Add library widgets
- Create different kinds of charts
- Make alarm tables
- Add personalized action buttons
- Etc.

Application Enablement Platform

From the Application Enablement Platform the user can design their application dragging and dropping.

Some of the functionalities are:

- Data transformation
- Rules
- Alarms
- Analytics
- Triggers
- SMS/email notifications
- Etc.