

# BMS



- Today, we will talk about a system that has become very popular in buildings, especially new ones.
- There are currently companies specialized in designing and implementing this system, so let's discuss it a bit.

## Introduction to the system:



## Alternate names:

**BAS:** building automation system

**BMCS:** building management Control system

- A Building Management System (BMS) is a system used for monitoring and controlling various operations within buildings.



## Let's talk about its key features:

- ✓ From one place and using a single person, you can control all building loads by using a computer connected to the system. (comfort element)
- ✓ The system is highly secure; not just anyone can access it, and certain loads cannot be controlled as he wants (security).
- ✓ The system significantly and completely saves energy, especially with general lighting and HVAC loads, by using motion sensors and presence sensors (savings).

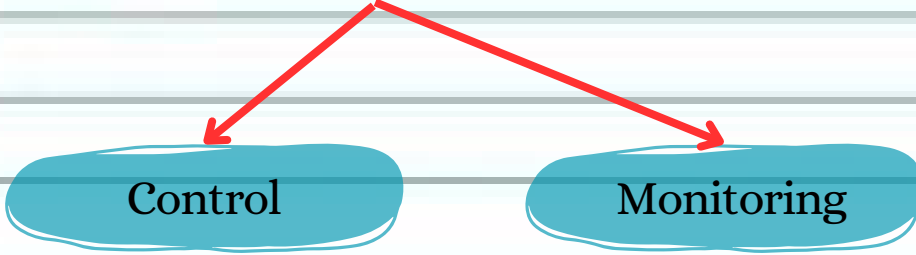


- ✓ You can monitor the status of all equipment, meaning what's operational, what's not, and receive alerts for all the events that occur in the building, especially for operations, disconnections, and faults. Additionally, you can generate reports with this information.

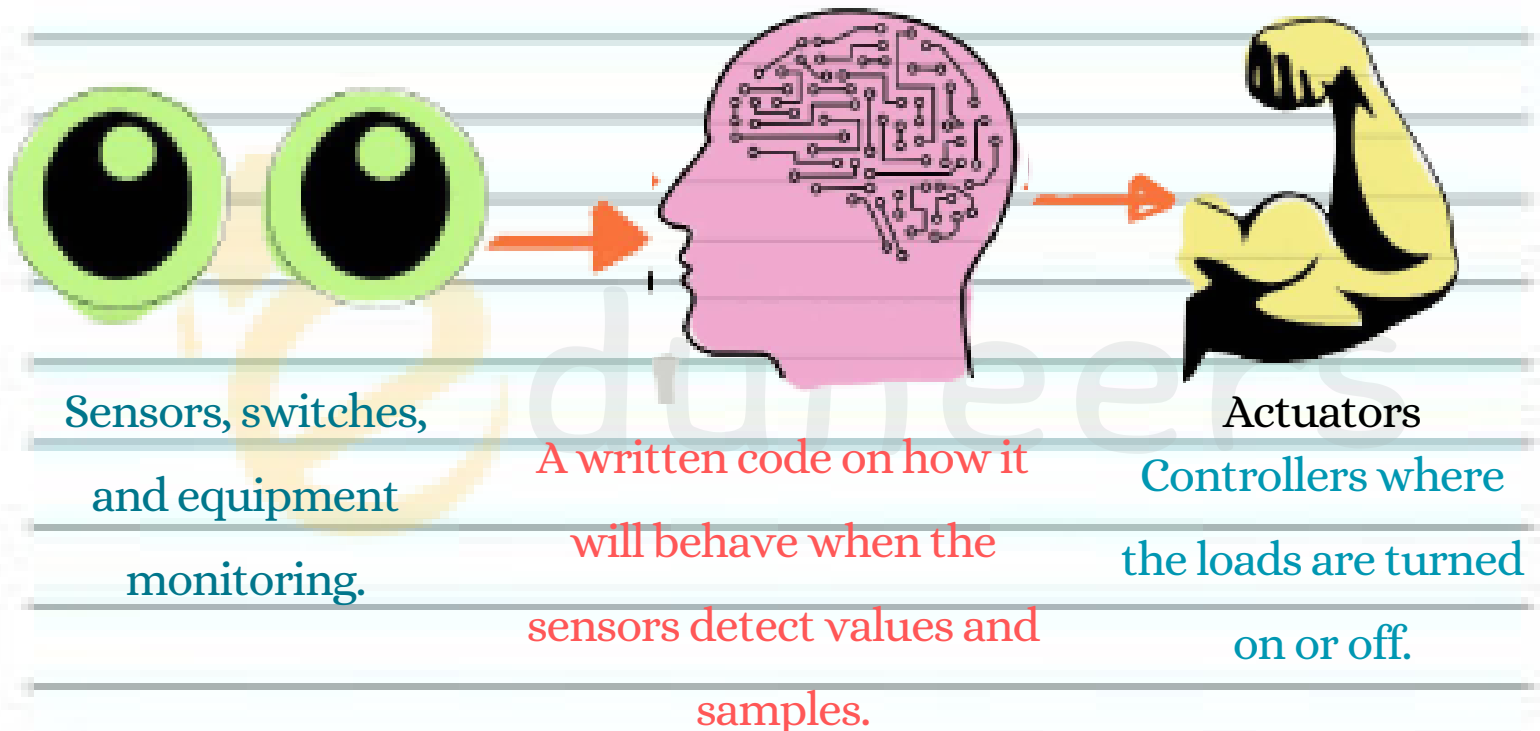
And other benefits...



I can summarize the system in two words:



a control system in the world consists of only 3 components,  
nothing else except "



## [Logic]

- If we apply the same concept to a Building Management System (BMS), we will find that it includes various sensors for monitoring different equipment, such as temperature and humidity sensors. Additionally, there is a (controller) with a program that specifies automatic actions when the sensors detect certain conditions

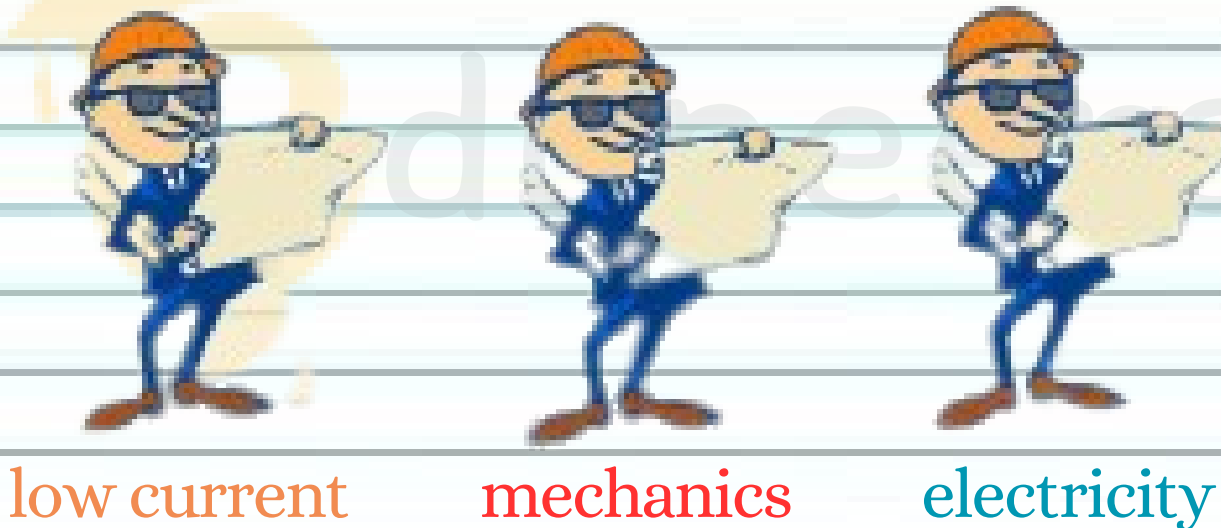


It reads specific values, and you will also find a set of actuators, or what is known as "Actuators," which the system controller will use to control and operate various things, turning them on and off, and so on.

With this setup, you have achieved the principle of a BMS (Building Management System). which is the combination of:

Monitoring and Control

## The relationship between project departments:



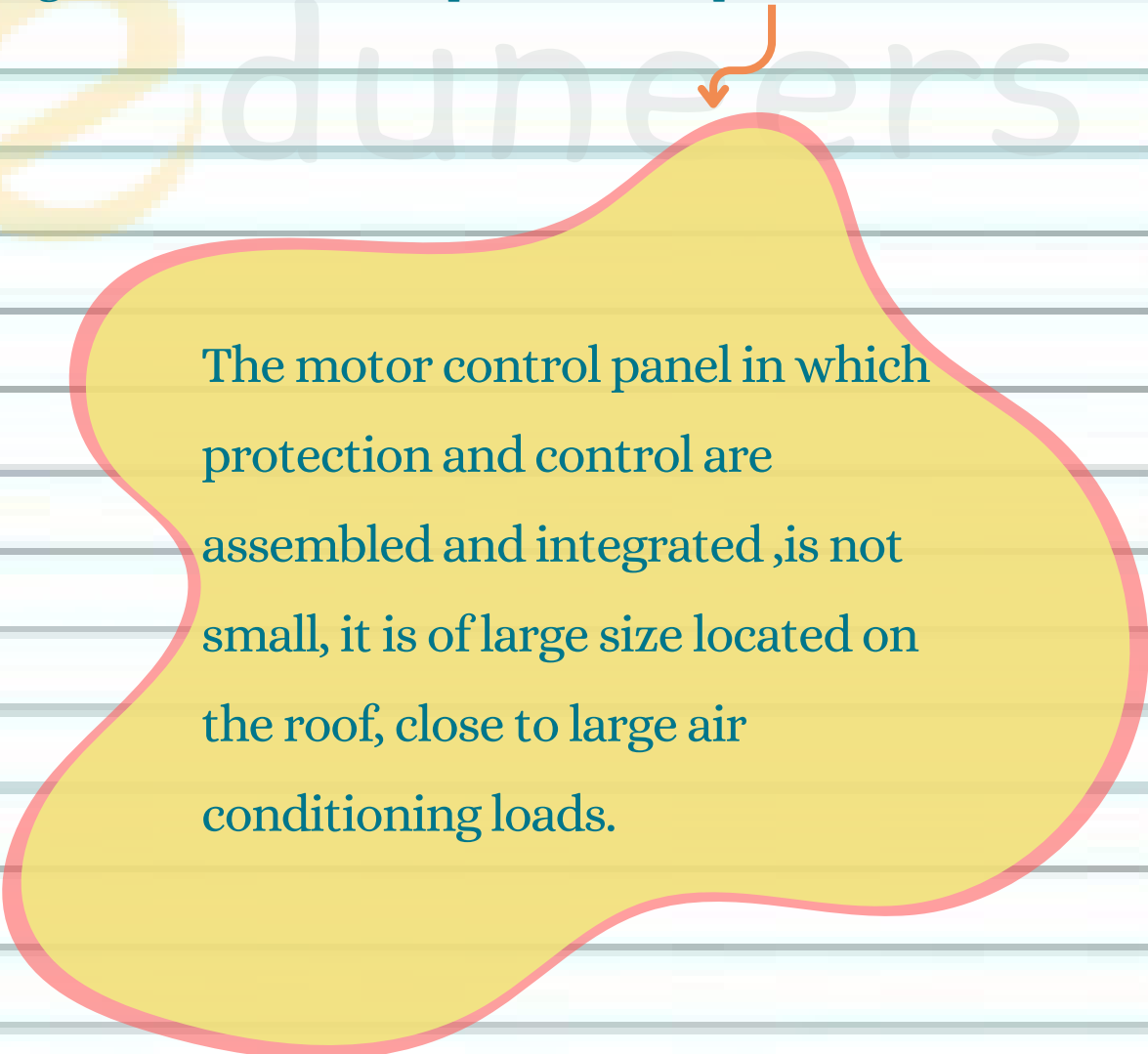
- Each department of the three determines two very important needs, which are:
  1. What does it want to monitor?
  2. What does it want to control?



**But...** let's agree that there are certain constants once it's been established that the building will have a comprehensive **BMS**, for example...

[1] The majority and most important part is the central air conditioning system, as it is the largest and most energy-consuming load in the building. For clarity, let's say that the goal of System 80% is to control and monitor the central air conditioning.

[2] When each department begins to define its points on the system, it is It is necessary to understand that, there may not be a BMS, and you do not have monitoring or control of the important MCC panel."



The motor control panel in which protection and control are assembled and integrated, is not small, it is of large size located on the roof, close to large air conditioning loads.



The most common loads associated with the system for the three departments are:

## [1] Mechanical

- The most energy-consuming loads, which have the largest share of the benefits of the **BMS**.

Like what?

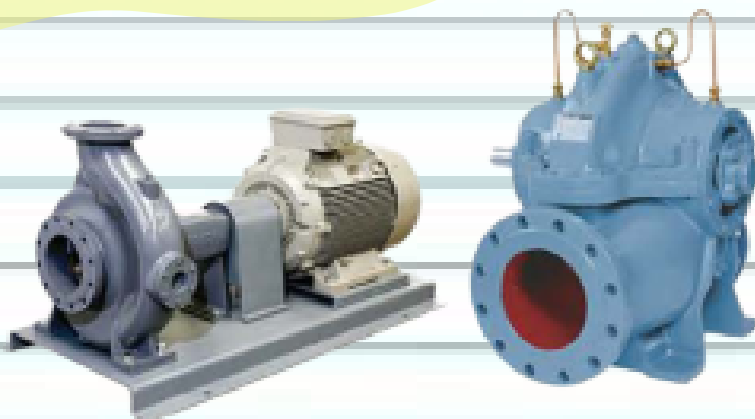
--Chillers--

In all its forms,  
water and air.



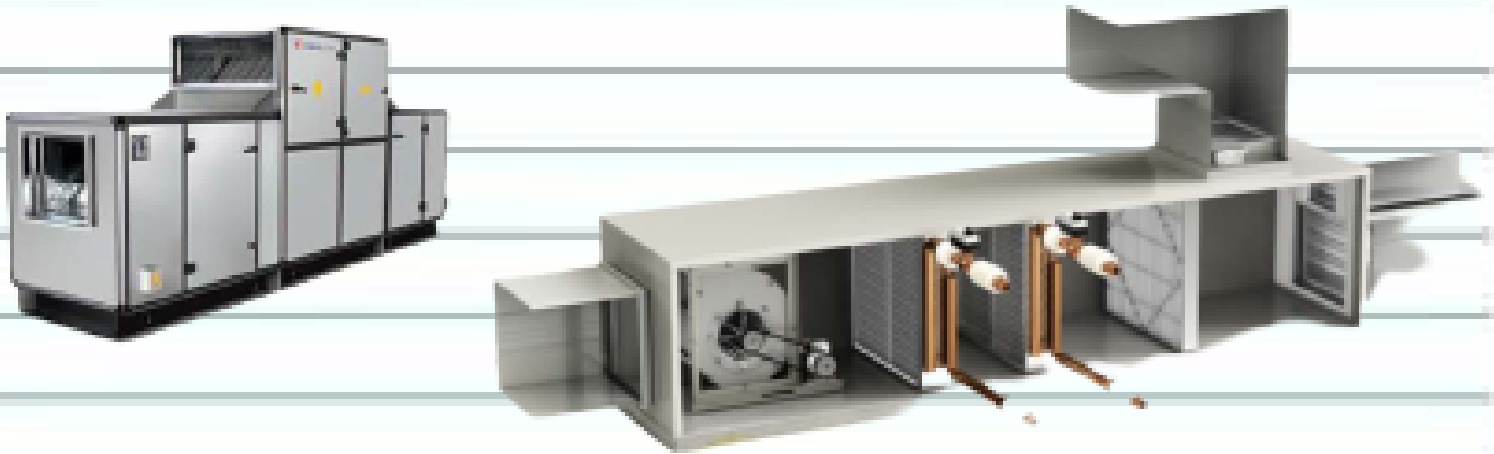
In all its forms, --Chilled Water Pump--

- Primary
- Secondary





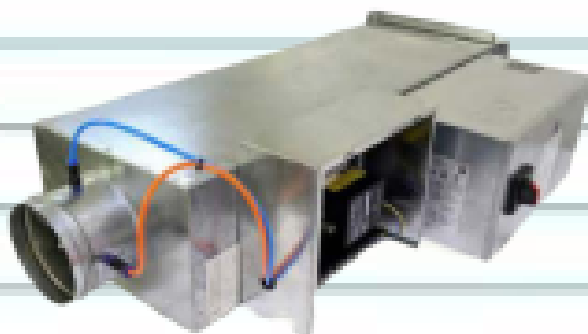
AHU  
“Air Handling Unit”



FCU  
“Fan Coil Unit”

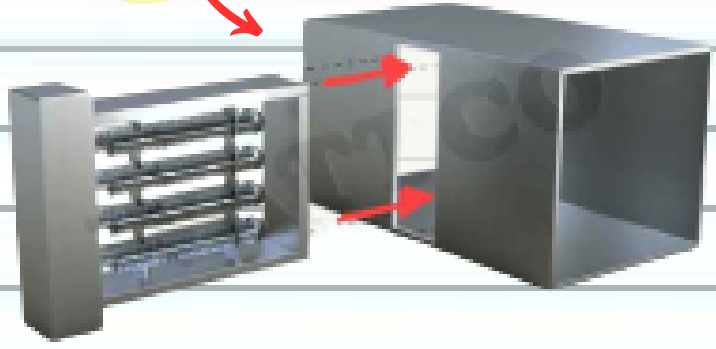


VAV  
“Variable Air Valve”





# Duct Heaters

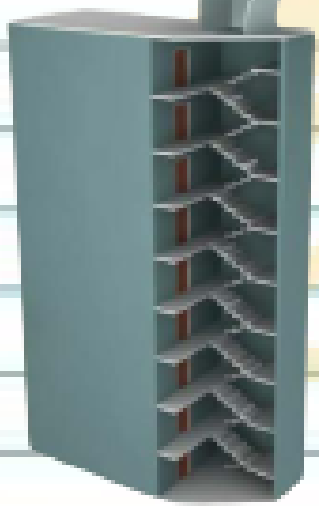


# Fans

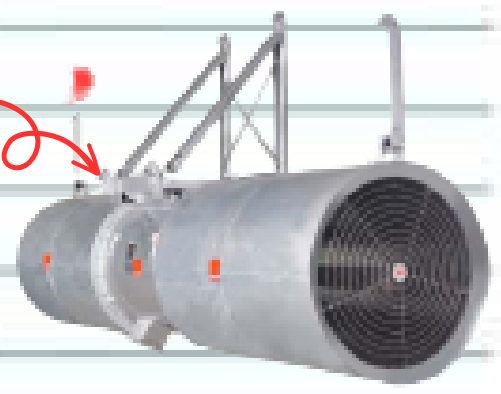
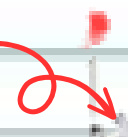
Exhaust



Pressurization

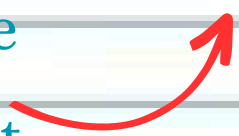


Jet



Smoke

Extract





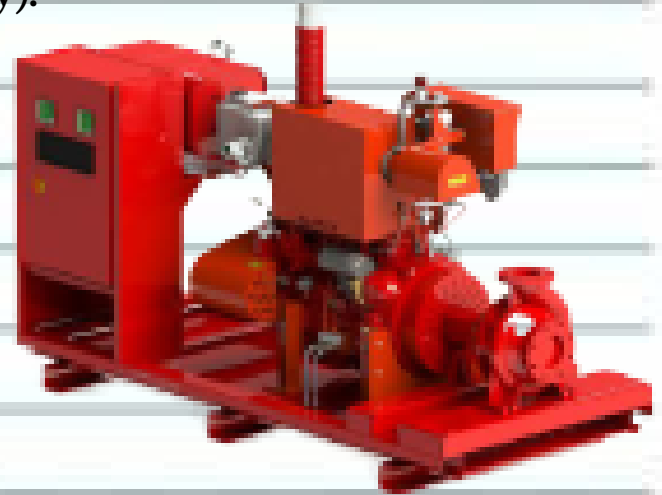


- There are significant mechanical loads outside the air conditioning system.

For example → "elevators "  
→ "Pumps"

(Monitoring only).

- Fire Fighting Pumps
- Domestic Pumps
- irrigation Pumps
- Sump Pumps



- Roughly, we've defined most of the heavy mechanical tasks that can be monitored and controlled through the BMS.

Let's move on to the second section, which is the..

[2] electrical

In the electrical load section, I can monitor and control..

RMU ← Ring main unit





-TR (Transformer)

-G (Generator)



-Panels: (In its various types.)

- MDB
- SmDB
- DB
- ATS

-UPS: (Uninterrupted Power Supply)



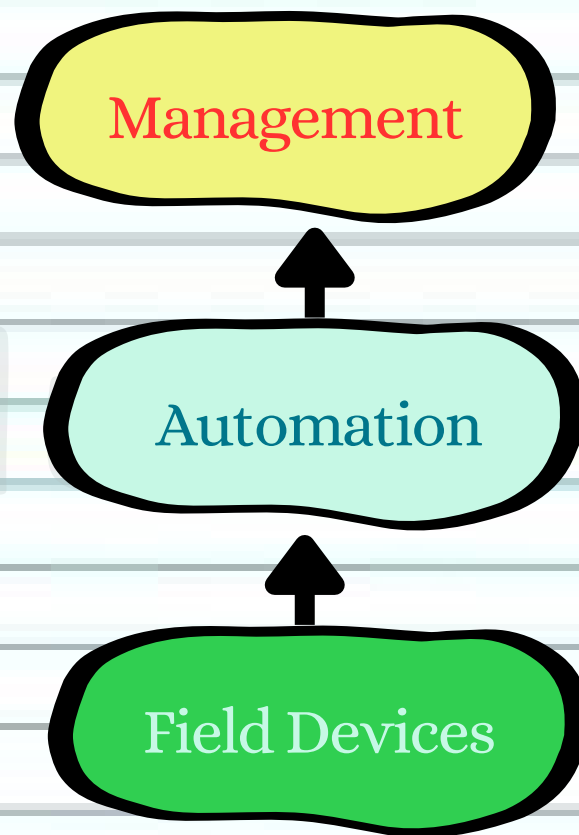


### [3] Low Current

- The third type within and connected to the **BMS** is the low-current systems in the building, with the most important being the systems responsible for **safety, security, and comfort**, such as:
  - Data system
  - CCTV System
  - Access Control system
  - Smart lighting Systems
  - Fire alarm system
- Additional systems may be included depending on the type, importance and level of the building

# BMS LEVELS

- The system consists of three layers, each of which contains a set of devices.



- Each level, as we agreed, consists of a set of devices, in order to things clear for you. Let's talk about each level, **[including its location and components]**

# Management



## The location:

- This part typically has a dedicated room in the building, often located on the ground floor.

## The contents:

- A set of **workstations** screens, some of which will be used to monitor all system operations and also control them.
- Server machines for storing **[large data]**.

### Server:



It is a high-performance computer (hardware + software) with very high capabilities and large storage capacities for handling extensive data.

- One or more printers for printing the events that occur on the system.



## Keep in mind:

- The BMS always comes with two servers, not just one, and their names are:
  - BMS Server
  - BMS Redundance Server

Backup server, as the data is extensive, and we don't want the system to fail due to such issues.



# automation



## The location:

- Panels distributed across the floors, and there may be more than one panel on the same floor if the building is large and divided into zones.

## The contents:

- The panels, as we agreed, are called:
  - BMS Panels
  - DDC Panels
- In the panels, there is a set of devices; I'll tell you about them now, and you have to know the names only. In a moment, we will talk about each device :
  - DDC Controllers
  - Router / gateway
  - The module
  - Control Transformers
  - Other components that complete the panel include circuit breakers, relays, and connection terminals

# Field Devices



## The location:

- On the equipment you want to control and monitor, for example, if you want to monitor an AHU unit, you'll find a set of sensors installed on its body. The same concept applies to anything you want to monitor.

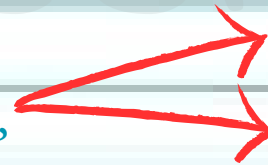
## The contents:

- We will summarize the contents as follows.



The system's eye.

"I can use it to see any value."



Sensors

Switches



The muscles of the system

"I can control anything with it".

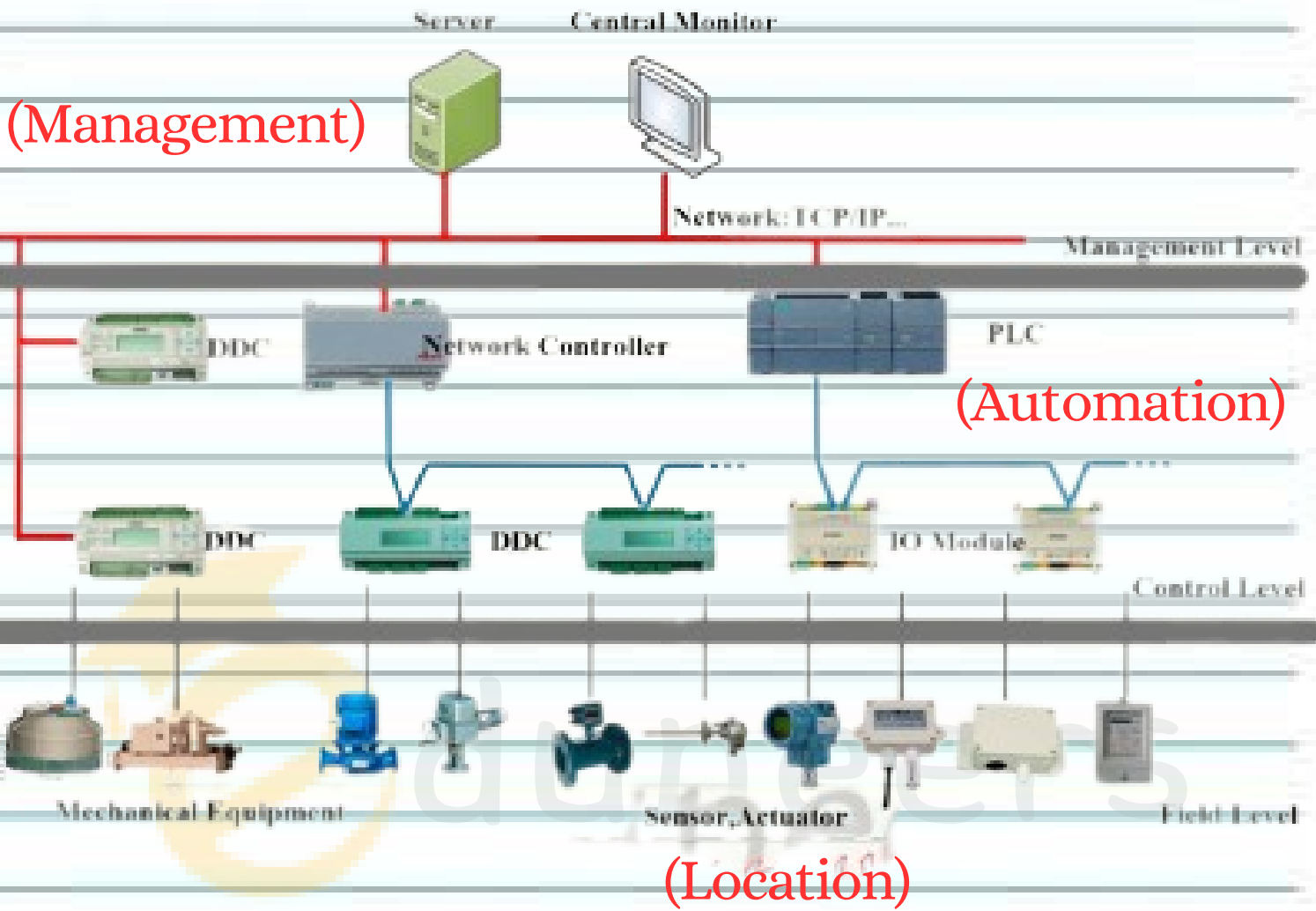


Actuators





- A summary of the three levels:



تم بحمد الله

محمد بن عبد الله

<<Translated by me>>