

IoT →

It's a network of Internet connected objects which collects and exchange data.

The 5 stages of IoT/IIoT →

1. Connect      Remote Access
2. Data Monitoring      Real Time Data/Alert, Proactive Monitoring
3. Data Analytics      Machine learning, Complex Analytics
4. Integrate      Automated Actions and Alerts (RPA), Supply chain forecasting
5. Omnichannel Solution      RAA, Supply chain forecasting.

Major Components of IoT →



Challenges →

1. Meeting customer expectations
2. Easing security concerns
3. Keeping IoT hardware updated
4. Overcoming connectivity issue
5. Waiting for government regulation

Sensing →

A device that provides a usable output in response to a specified measurement. The sensor attains a physical parameter and converts it into a signal suitable for processing. The characteristics of any device or material to detect the presence of a particular physical quantity.

1. Temp
2. Pressure
3. Motion
4. Level
5. Image
6. Water Quality
7. Chemical
8. Smoke

Activation →

It is a machine component/system that moves/controls the mechanism of the system.

Sensors in the device sense the environment, then control signals are generated for the actuators according to the actions needed to perform.

Types of Actuators → Sensors + Actuator + Network

1. Hydraulic
2. Pneumatic
3. Electrical
4. Thermal/Magnetic
5. Mechanical

Hydraulic Actuators →

- Uses hydraulic power, which uses fluid motion.
- Mechanical motion is converted to rotary, linear or oscillatory motion.
- Can generate huge amount of force.

Disadvantages →

- Fluid leak causes inefficiency.
- Expensive.
- High maintenance

Pneumatic Actuators →

- Uses energy formed by vacuum/compressed air
- Converts into linear or rotary motion.
- Durable, low maintenance

Disadvantages →

- Air compressor should be running continuously
- Loss of pressure can make less efficient.

## Electrical Actuators →

- Uses electrical energy, activated by a motor.
- Converts electrical energy into mechanical torque.
- Reprogrammable.

## Disadvantage →

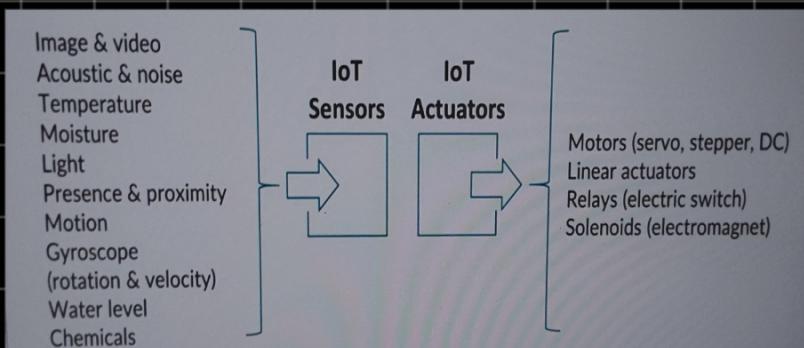
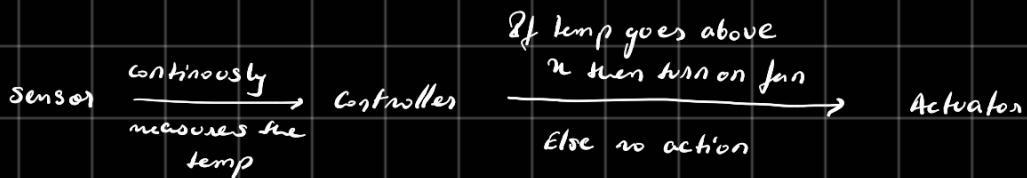
- Expensive

## Thermal/Magnetic Actuators →

- Activated by thermal or mechanical energy.
- Shape Memory Alloys (SMA) or Magnetic Shape Memory Alloys (MSMA).

## Mechanical Actuators →

- Executes movement by converting rotary motion, linear motion. It involves pulleys, chains.
- Soft Actuators
- Shape Memory Polymers
- Light Activated Polymers



## Sensor

- Detects changes in environment and sends information to other electronic devices.
- Connected to the input port of the system.
- To monitor changes in the environment.
- Output, electrical signal

## Actuators

- A component of machine responsible for moving/controlling mechanism.
- Connected to the output port of the system.
- To control the environment.
- Output, movement.

7 components of IoT Ecosystem →

- IoT device
- Security
- Network
- Gate way
- Cloud
- Application
- User

5 value creation points →

- Physical Thing
- Connection
- Sensors/Actuators
- Analysis
- Data service

7-layers of IoT →

User

Application

Data Analysis

Data ingestion

Global infrastructure

D — Com — Calc Bus — Data Ingest. — DLT  
Sellers — Applica — user

Q. — NFT — sensor — cloud — Applica —  
user — Applica

Any thing, sensor, only in, Data service — in

Connectivity

Dot Device