



# **SNS COLLEGE OF ENGINEERING**

**Kurumbapalayam(Po), Coimbatore – 641 107**

**Accredited by NAAC-UGC with 'A' Grade**

**Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai**

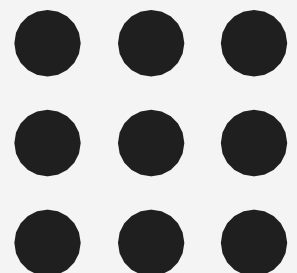
## **Department of AI & DS**

**Course Name – 19AD505 Internet of Things & AI**

**III Year / V Semester**

**Unit 1 – IoT INTRODUCTION AND APPLICATIONS**

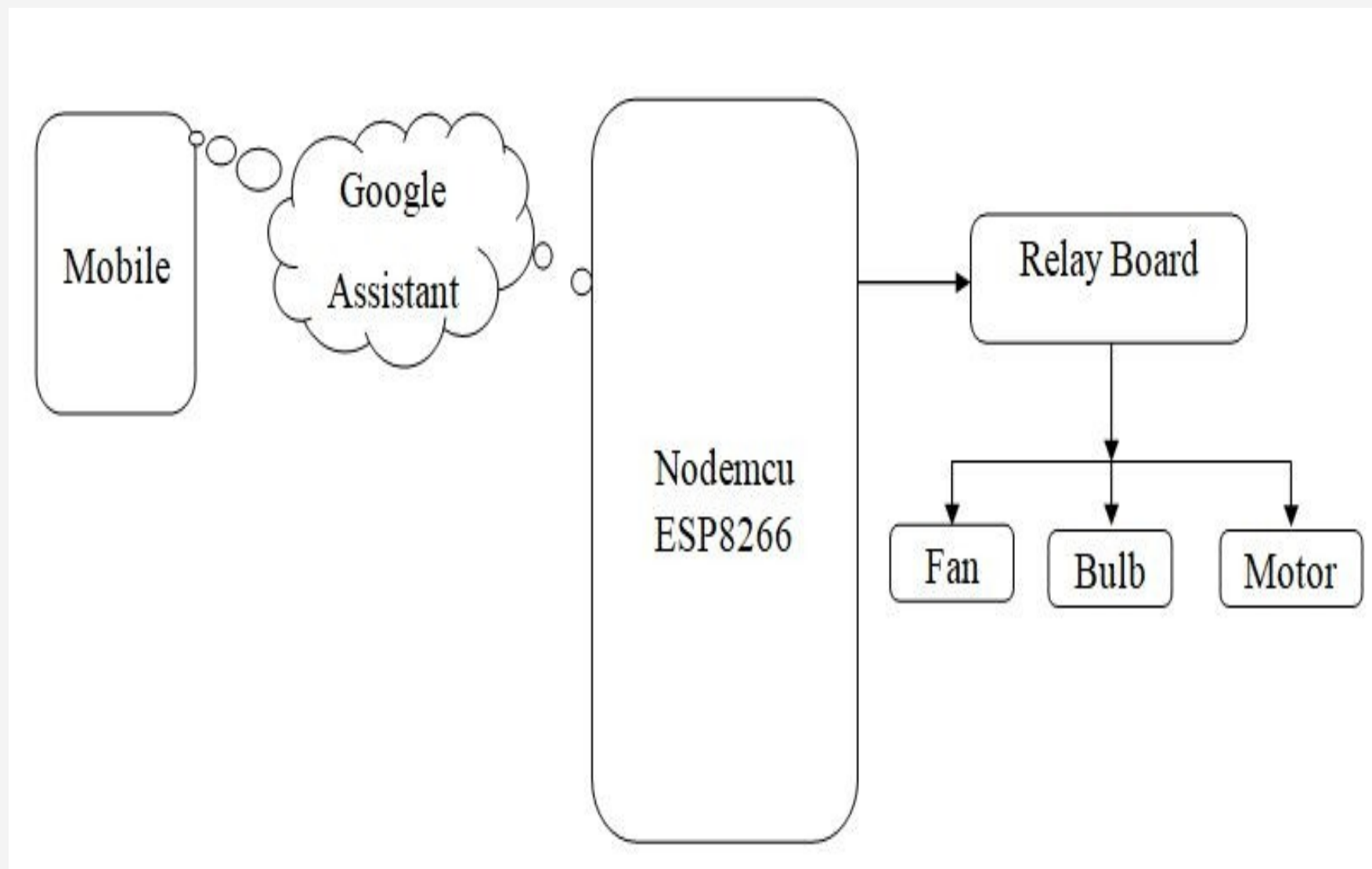
**Topic 1- Overview and Motivations - IPv6 Role**





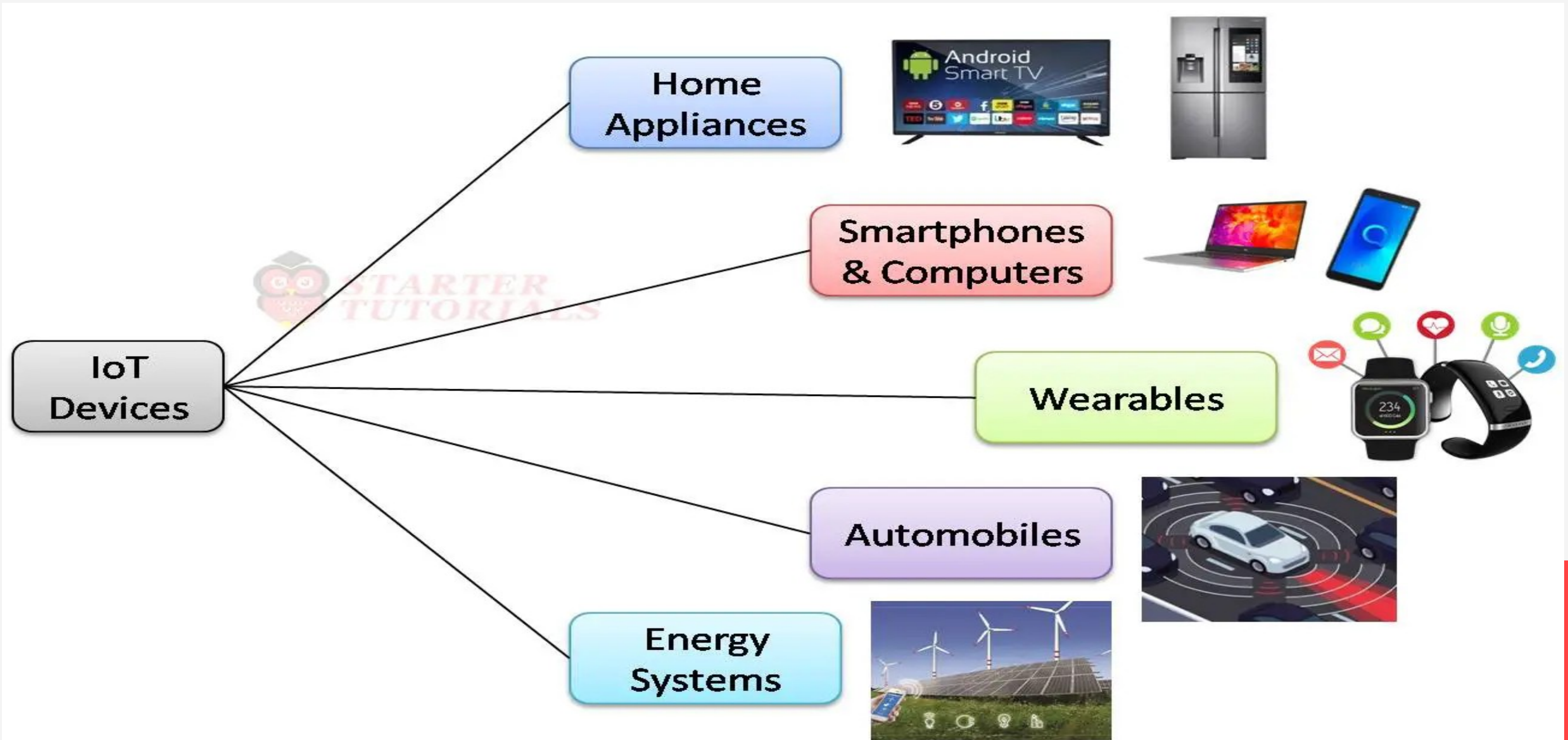
# what is IoT

- **example**
  1. Google Home Voice Controller. ...
  2. Amazon Echo Voice Controller. ...





# where lot used





# what is Ai intelligence

- **Ability of computer to think like a human**
- **problem-solving and decision-making capabilities of the human mind.**
- **perform tasks commonly associated with intelligent beings.**
- **the ability to learn and to reason, to generalize**



# what is Ai intelligence



## EXAMPLE:

- 1.WEB SEARCH ENGINES -GOOGLE SEARCH
- 2.RECOMMENDATION SYSTEM -  
YOUTUBE ,NETFLIX.....
- 3.RECOGANIZING HUMAN SPEECH-SRI ,ALEXA
- 4.ChatGPT

## note:

**intelligence :This intelligence enables them to study information and make decisions in the same way that a human brain does.**

## when AI meets IoT

- ✓ **AI-integrated IoT devices can analyze data to reveal patterns and insights and adjust system operations to become more efficient.**
- ✓ **Data can be generated and analyzed to identify points of failure, which enable the system to make adjustments as needed**
- ✓ **example**
- ✓ **The AI and IoT application attempts to gather as much information as possible, mimicking what a person senses. It then applies rules, such as "people can't work where light levels are below x," and, from the conditions sensed and the application of those rules, decides to turn on a light.**

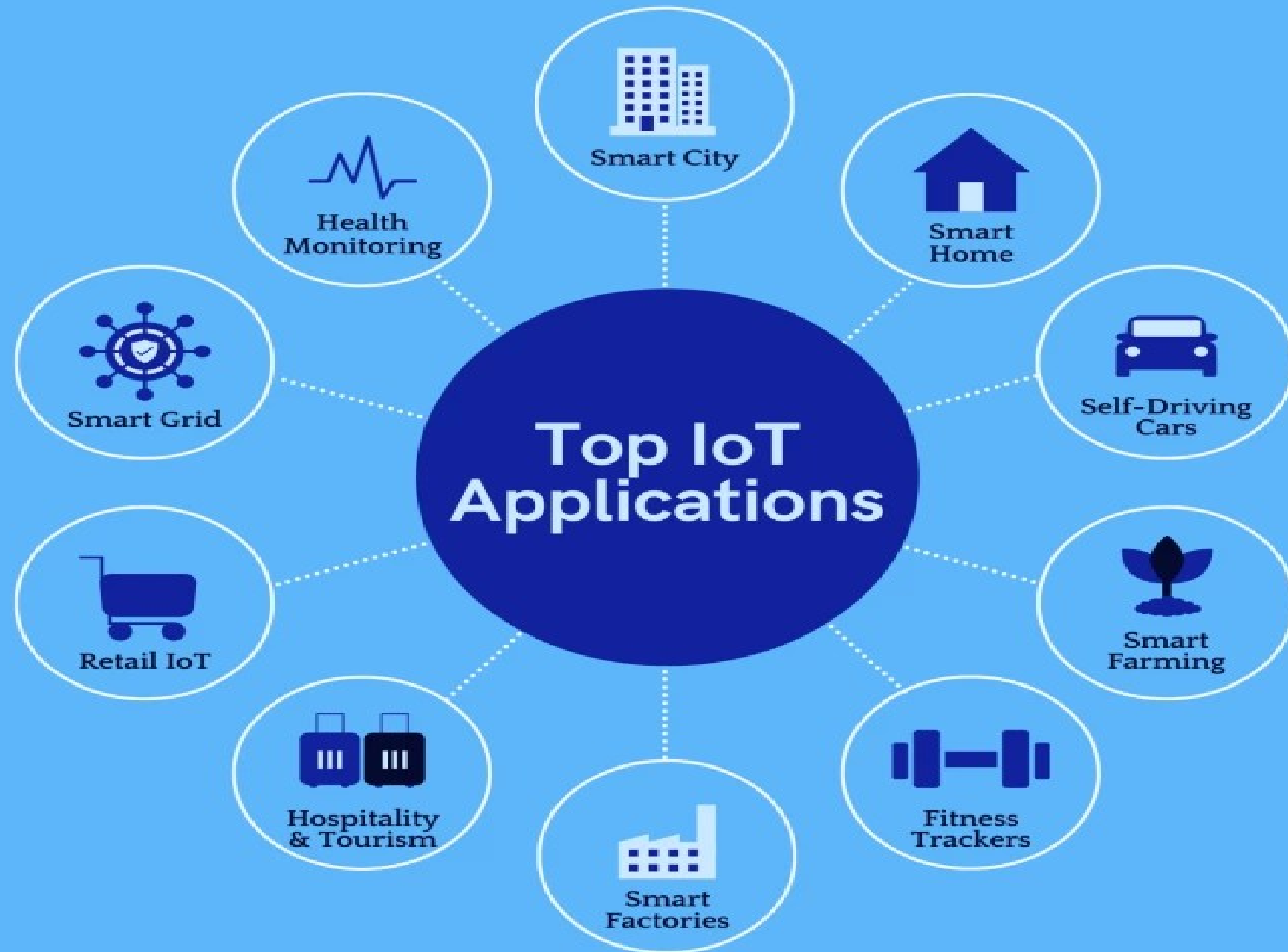




# Exercising IoT using AI in the Real World

- ✓ When a group of connected devices collects and integrates raw data, software programmes with machine intelligence capabilities analyse the data. After a thorough examination, the final result contains useful information.
- ✓ **Manufacturing Robots**
- ✓ **Autonomous Vehicles- Tesla's self-driving automobiles**
- ✓ **Retail Analytics**

# Exercising IoT using AI in the Real World

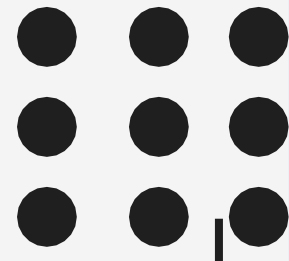




# Overview and Motivation

- 1. The goal of the Internet of Things is to enable things to be connected anytime, anyplace, with anything and anyone ideally using any path/network and any service**
- 2. Objects make themselves recognizable they can communicate information about themselves.**
- 3. This happens with emergence of**
  - cloud computing capabilities -organization can connect thousands or millions of IoT devices to the cloud without need to manage server .**
  - IPv6 -unlimited addressing capacity.**

# Overview and Motivation





# IoT as a network of networks Makes more powerful

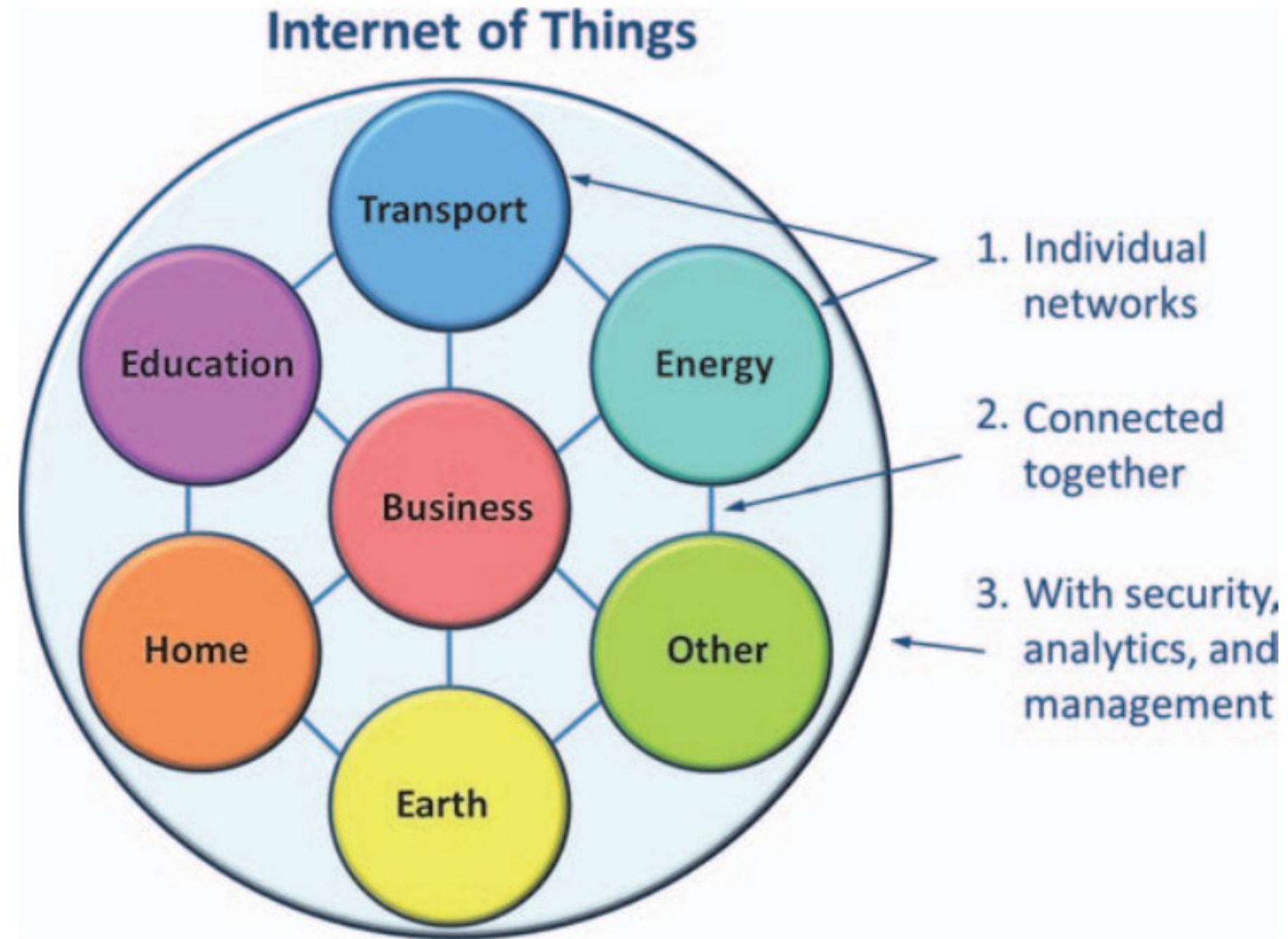


Fig. 2.5 IoT viewed as a network of networks.



The Internet is not only a network of computers, but it has evolved into a network of devices of all types and sizes, vehicles, smartphones, home appliances, toys, cameras, medical instruments and industrial systems, all connected, all communicating and sharing information all the time

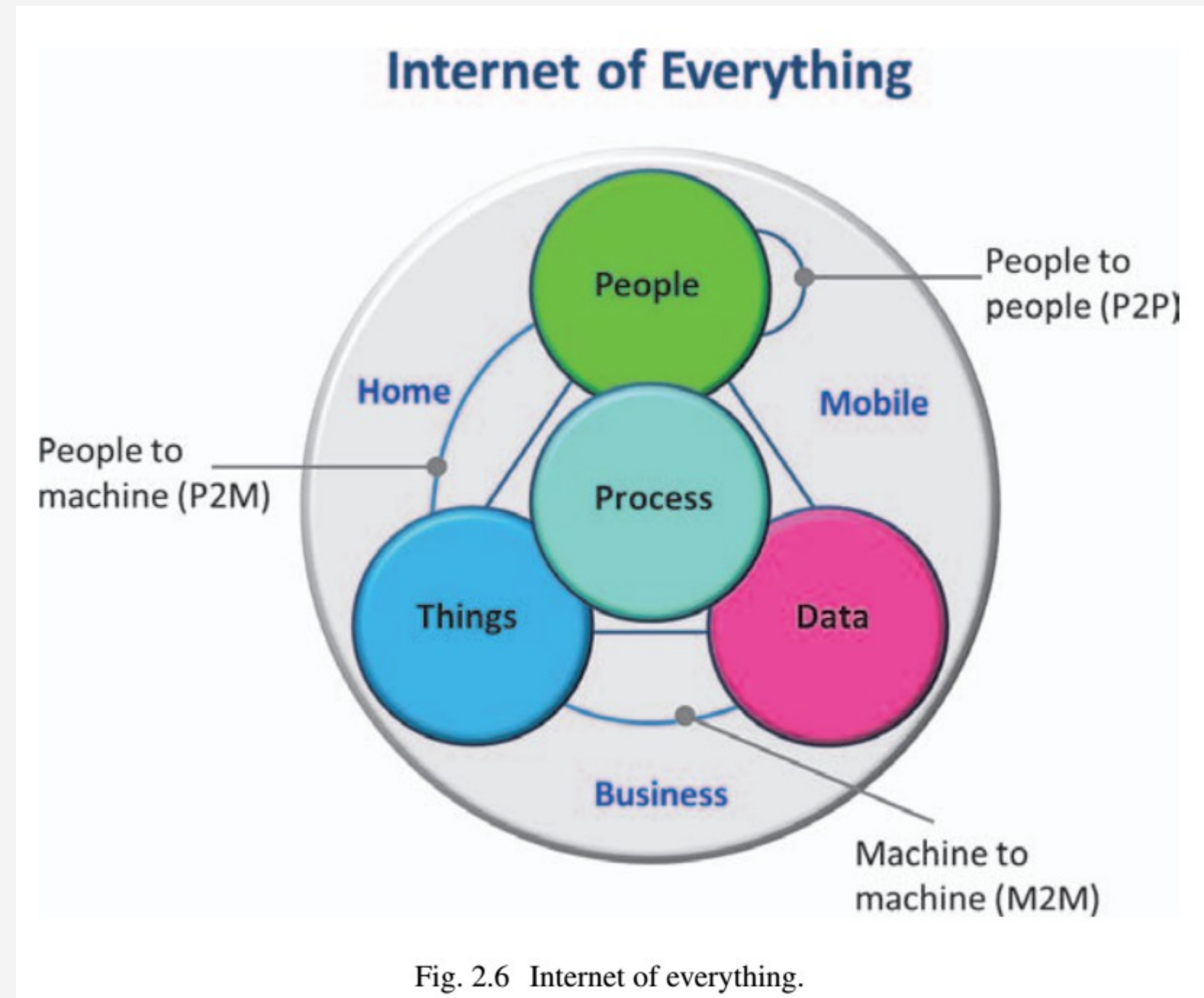


Fig. 2.6 Internet of everything.



# Overview and Motivation

## The International Telecommunication Union (ITU)

1. It is responsible for coordinating and regulating international telecommunications and global connectivity .
2. they bring a standards for next generation networks (NGN)

### NGN:

1. NGN is designed to offer a flexible and scalable platform for delivering various types of multimedia services, including voice, data, video, and interactive communication.
2. Describes the overall concept and architecture of modern telecommunications networks. NGN encompasses various protocols and technologies to achieve its goals of providing enhanced services and capabilities.



# Overview and Motivation

## Definition:

**“Internet of things (IoT): A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.**

## Characteristics

- ✓ **Dynamic and self-Adapting:**
- ✓ **Self – Configuring:**
- ✓ **Interoperable communication protocols:**
- ✓ **Unique Identity:**
- ✓ **Integrated into information network:**



# Overview and Motivation



## Smart Planet Green Environment

- Environmental sensors
- Water, power leak detection
- Pollution, weather monitoring



## Smart Cities Connected Communities

- Lighting, water management
- Monitoring & security
- Traffic control



## Smart Energy Electric Grid

- Voltage and power sensors
- Meters and breakers
- Fault detection



## Smart Buildings Buildings, Smart Homes

- Thermostats, HVAC, lighting
- Presence sensors, lockers, actuators
- Meters, smart-plugs, HEC



## Smart Transport ITS, HEVs, EVs

- Electric Mobility, EVs and HEVs
- High Speed Trains
- Infrastructure, V2I, V2V, V2I+I



## Smart Industry Industrial Environments

- Lightning, security, actuators
- Production control
- Robotics



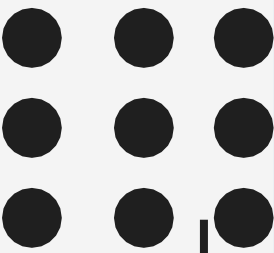
## Smart Health Healthcare System

- People monitoring
- Bio sensors, probes
- Remote health



## Smart Living Entertaining, Leisure

- Independence through technology
- Information when you need it
- Connected when you need it





# Overview and Motivation



## IOT device

1. unique identities
2. sensing
3. Actuating and
4. monitoring capabilities



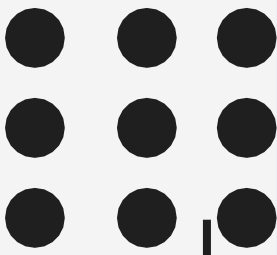
# Role of IPv6

## IPv6-internet protocol version 6

most recent version of the Internet Protocol, which is the underlying protocol used for identifying and communicating with devices on a network.

Designed to replace the IPv4 due to the exhaustion of address permanent unique identifier, an object ID (OID)

Unique network address (Nadr)	IPv6
32-Bit Addressing Which Is Able To Support About 4.5 Billion Devices.	128-Bit Addressing. It Supports Approximately 350 Trillion Trillion Devices.
For example, 192.0. 2.146 is a valid IPv4 address.	An example of an IPv6 address is: 2001:0db8:85a3:0000:0000:8a2e:0370:7334



# Role of IPv6

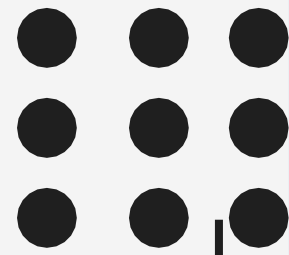
## Advantages of IPv6:

- 1.Expanded Address Space-allowing for a virtually unlimited number of unique IP addresses.**
- 2.Address Format- eight groups of four hexadecimal digits, separated by colons (:). 2001:0db8:85a3:0000:0000:8a2e:0370:7334**
- 3.Auto-Configuration- built-in support for automatic address configuration,easy to process of assigning and configuring IP addresses for devices.**
- 4.Enhance security- IPv6 includes built-in features for security and encryption**

**IPsec (Internet Protocol Security) -provide secure communication and authentication between devices.**
- 5.Simplified Network Management- every device can have a globally unique IP address, making network management and troubleshooting easier**

## Advances of IPv6

- “Plug-and-play”: IPv6 includes a “plug-and-play” mechanism that facilitates the connection of equipment to the network.
- Mobility: IPv6 includes an efficient and robust mobility mechanism namely an enhanced support for mobile IP, specifically, the set of mobile IPv6



**THANK YOU**