GLS UNIVERSITY

Faculty of Computer Applications & Information Technology

Current and Future Trends in IT

Unit – 5

Integrated Msc(IT)

An Introduction

- Information technology is an industry on the rise business structure, job growth, and emerging technology will all shift in the coming years.
- Current trends are improving and presenting new functions in fields like medicine, entertainment, business, education, marketing, law enforcement, and more Information technology is advancing so rapidly that new developments are quickly replacing current projections.

Smart Card

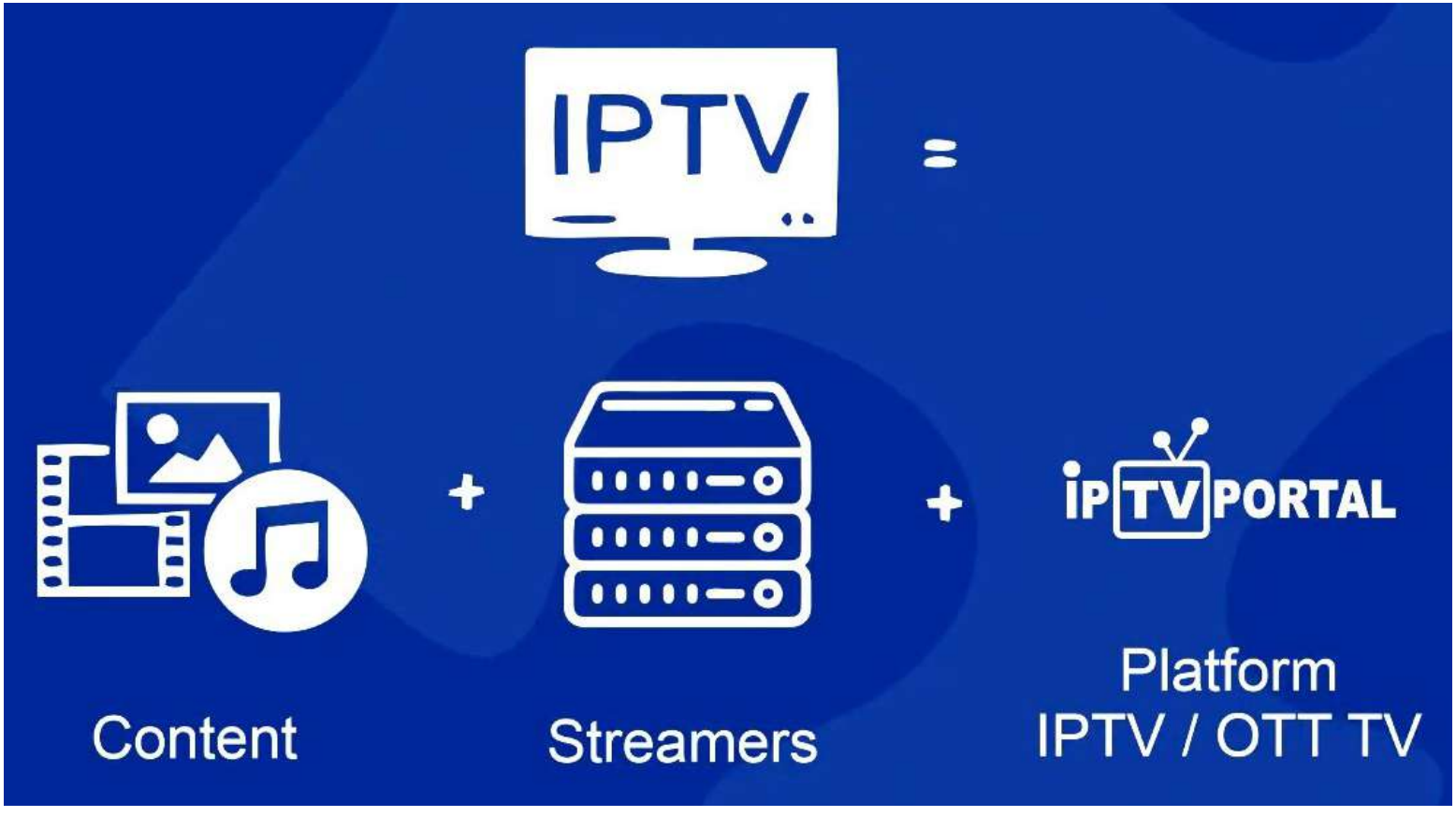
- Smart cards are small, portable pocket-size cards having data storage ability.
- They are quite different from magnetic stripe cards.
- Most smart cards incorporate an Integrated Circuit Chip (ICC) inside them having some computational functionality and I/O support.
- According to the applications for which smart cards are used, they are classified as microprocessor cards and memory cards.
- Depending on the way the smart ca re categorized as contact and contactless

Smart Card Applications

- Personal Finance
- Health Care
- Mobile Communications
- Electronic Purse
- Campus Identification and Access

Internet Protocol Television (IPTV)

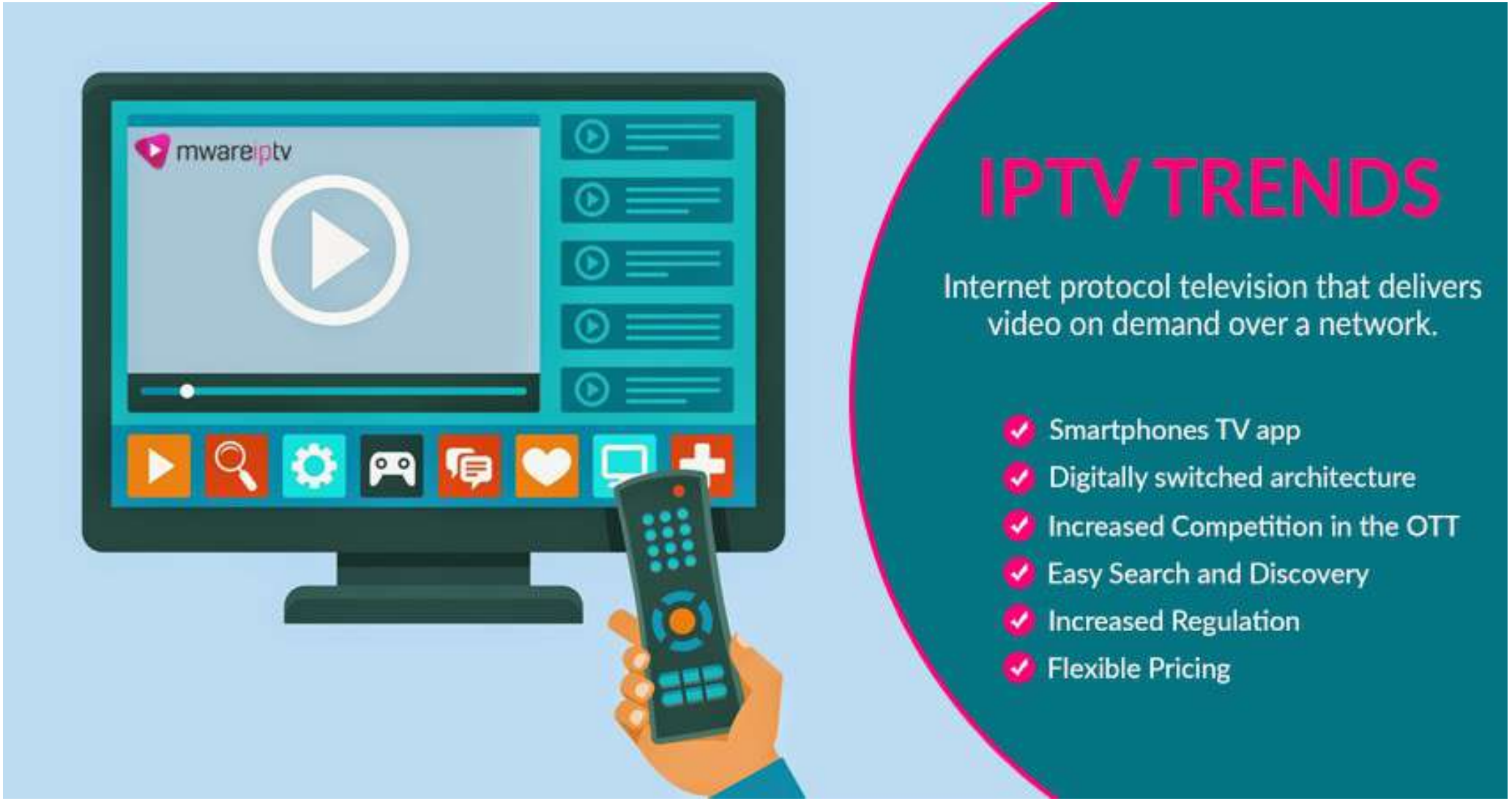
- IPTV is a system that provides the television services to the end users via packet switched network.
- This network uses Internet protocol suite to transmit audio, video and control signals thereby providing quality of service, security, and reliability.



Internet Protocol Television (IPTV)

- IPTV sends data to the end user(s) in two ways, namely, unicast andmulticast (or broadcast).
- The core of any IPTV system is the operator's central distribution center where the video stream is encoded and split into packets, which are transmitted over the IP network.
- The packets traveling through the network are received by the local exchanges—the IPTV middleware that routes the packets to the individual subscribers.
- At the subscribers' end, there is a device known as set top box, which receives the incoming data, reassembles the packets into coherent video stream, and decodes it to be viewed on the television or some other form of screen.

Internet Protocol Television (IPTV)



Blogging

- The term blog is the shortened form of web log.
- It is basically a type or part of website maintained by an individual with regular entries of news on some particular topic (like education, entertainment, or politics), description of events, personal thoughts, and so on.
- An important property of blog is that it allows the readers to leave their comments and share their thoughts with the blog owner or other readers.
- The process of creating, maintaining, writing or adding content to a blog is known as blogging

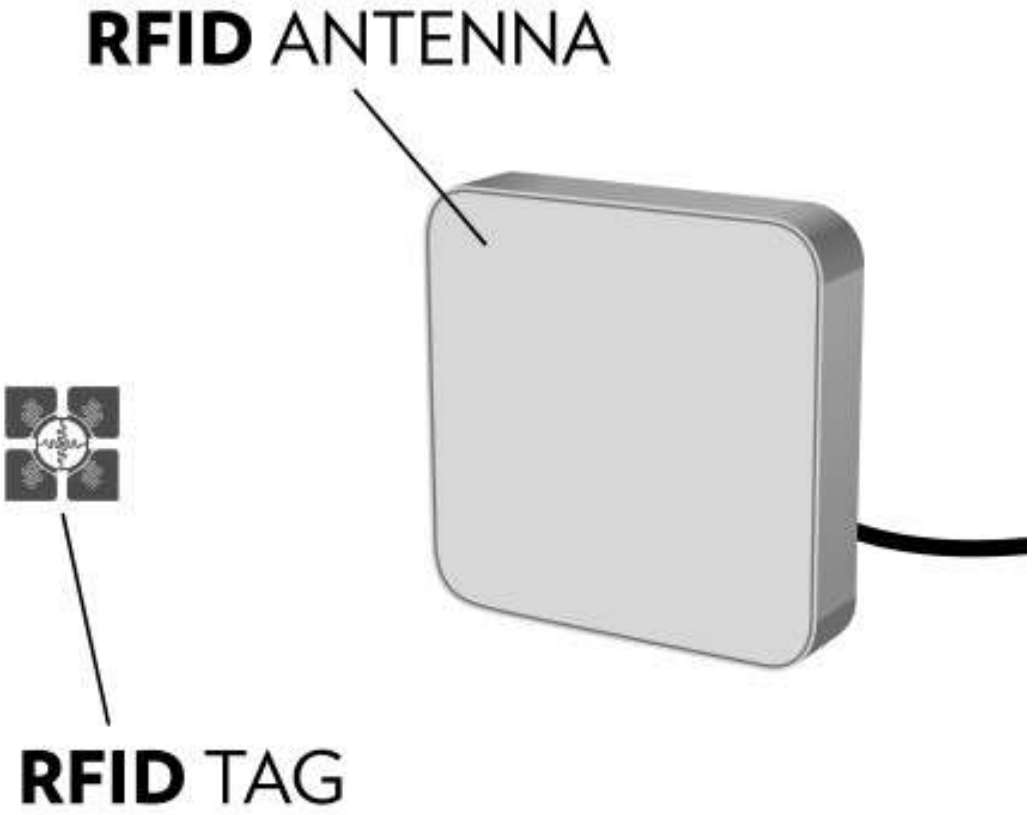
Blogging

- **Most common types of blogs include:**
- **Personal Blog:** It can be considered as an online diary maintained by an individual on which he/she records daily events, commentary, or articles
- **Corporate Blog:** also known as business blog, it is created and maintained for business purposes.
- **Media Blog:** It contains media type content such as audio and video.

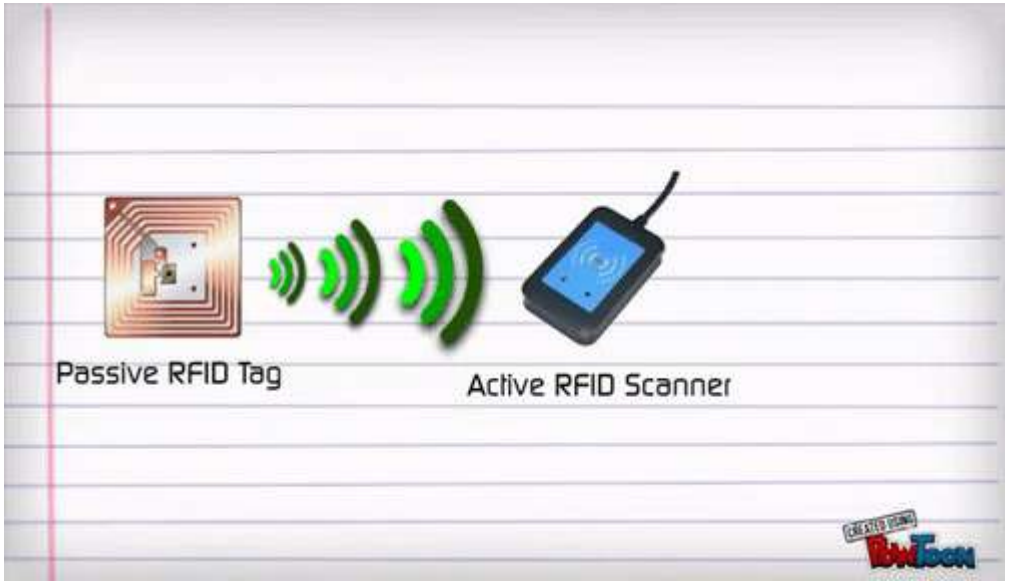
RFID

- RFID is an auto-identification technology, which is used to capture and transmit identification details (including location) of an object wirelessly.
- RFID system consists of the **three** basic components:
  - **RFID Tag (or Transponder):** It contains the identification number and other data of the object on the silicon chip in encoded form.
  - **Reader:** The stored data on RFID tag is accessed (i.e read/write) by the reader. After accessing the data, the reader sends the data to the processing device (such as computer) connected with it.
  - **Processing Device:** It processes the data sent by the reader.

RFID

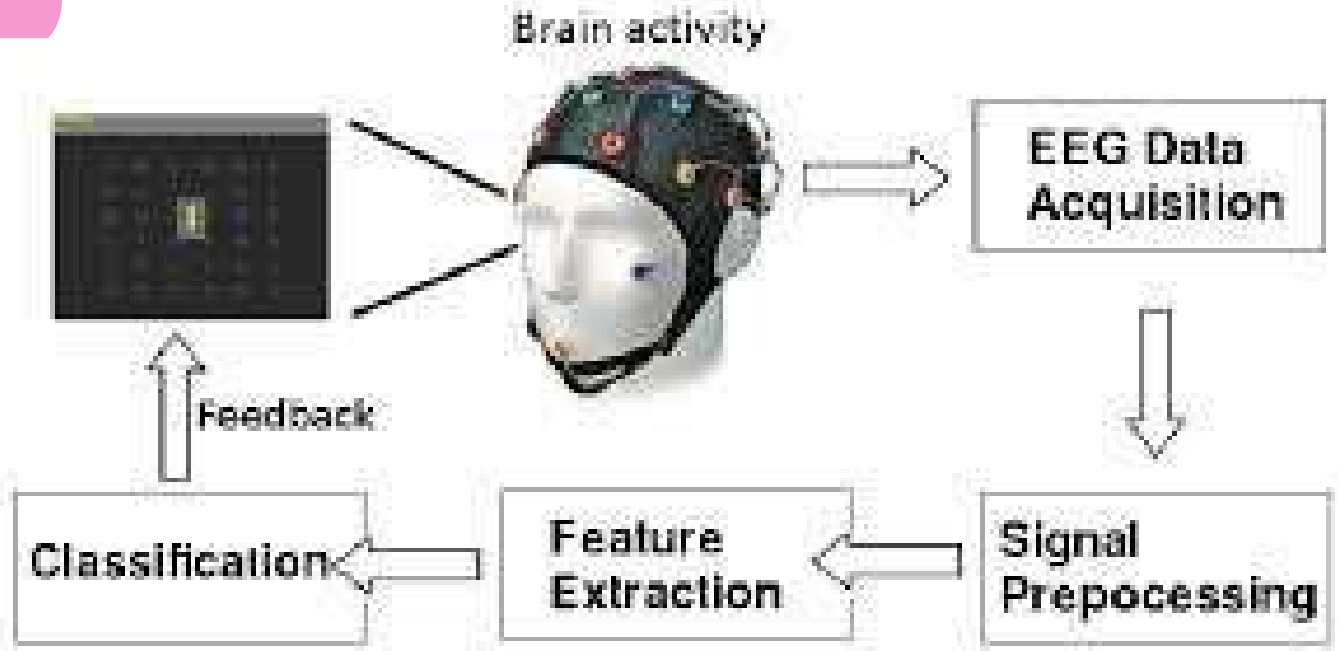


RFID

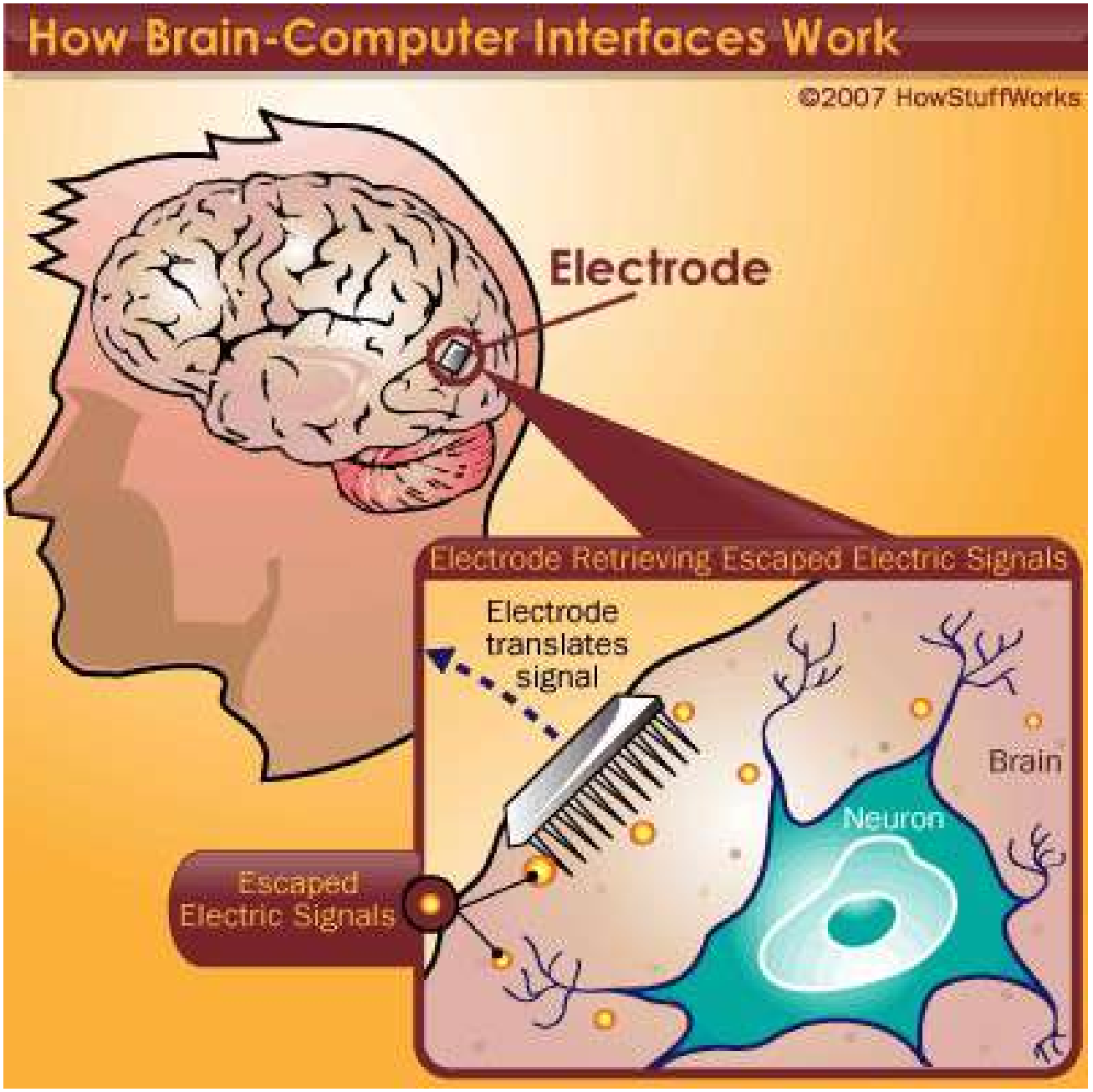


Brain Computer Interface (BCI)

- Brain computer interface (BCI) is a communication pathway between the brain (of either human or animal) and some external device like computer system.
- BCI devices are used to transmit or capture the brain signals, which can further be used to restore function or movement to sensory organs or to direct implanted prosthetic device as natural li ¹

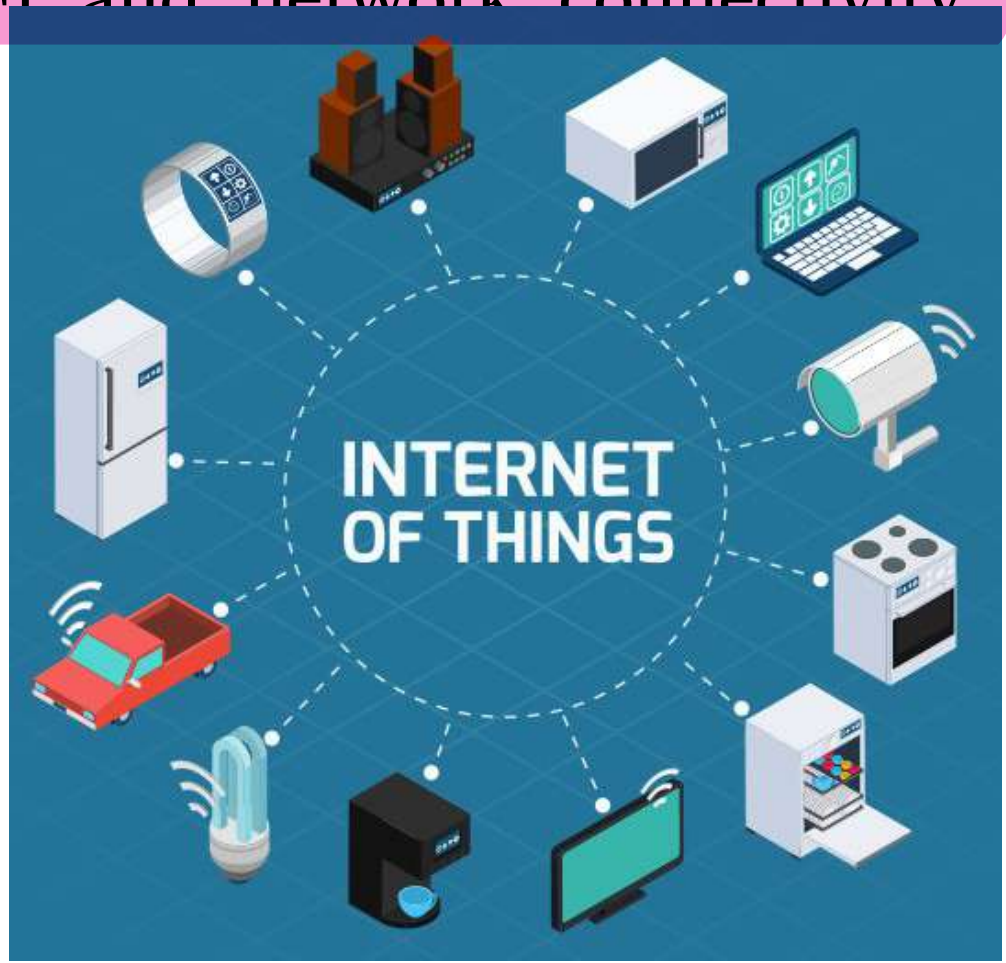


Brain Computer Interface (BCI)



Internet of Things (IoT)

- The Internet of Things, or IoT, refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data.
- The Internet of Things (IoT) is an emerging movement of products with integrated Wi-Fi and network connectivity abilities.



IOT

- The fundamental components that make internet of things a reality are:

- **Hardware –** Making physical objects responsive and giving them capability to retrieve data and respond to instructions

- **Software –** Enabling the data collection, storage, processing, manipulating and instructing

- **Communication Infrastructure –** Most important of all is the communication infrastructure which consists of protocols and technologies which enable two physical objects to exchange data

Why connect things in IOT?

- With automatic flow of data from various things it would be possible for us to take informed decisions and initiate actions.
- Reduce cost
- Reduce loss
- Reduce cost of operation
- Products and components / solutions built with the concept of things having communication capabilities and being part of the IOT are referred to as ‘smart’ products / solutions.

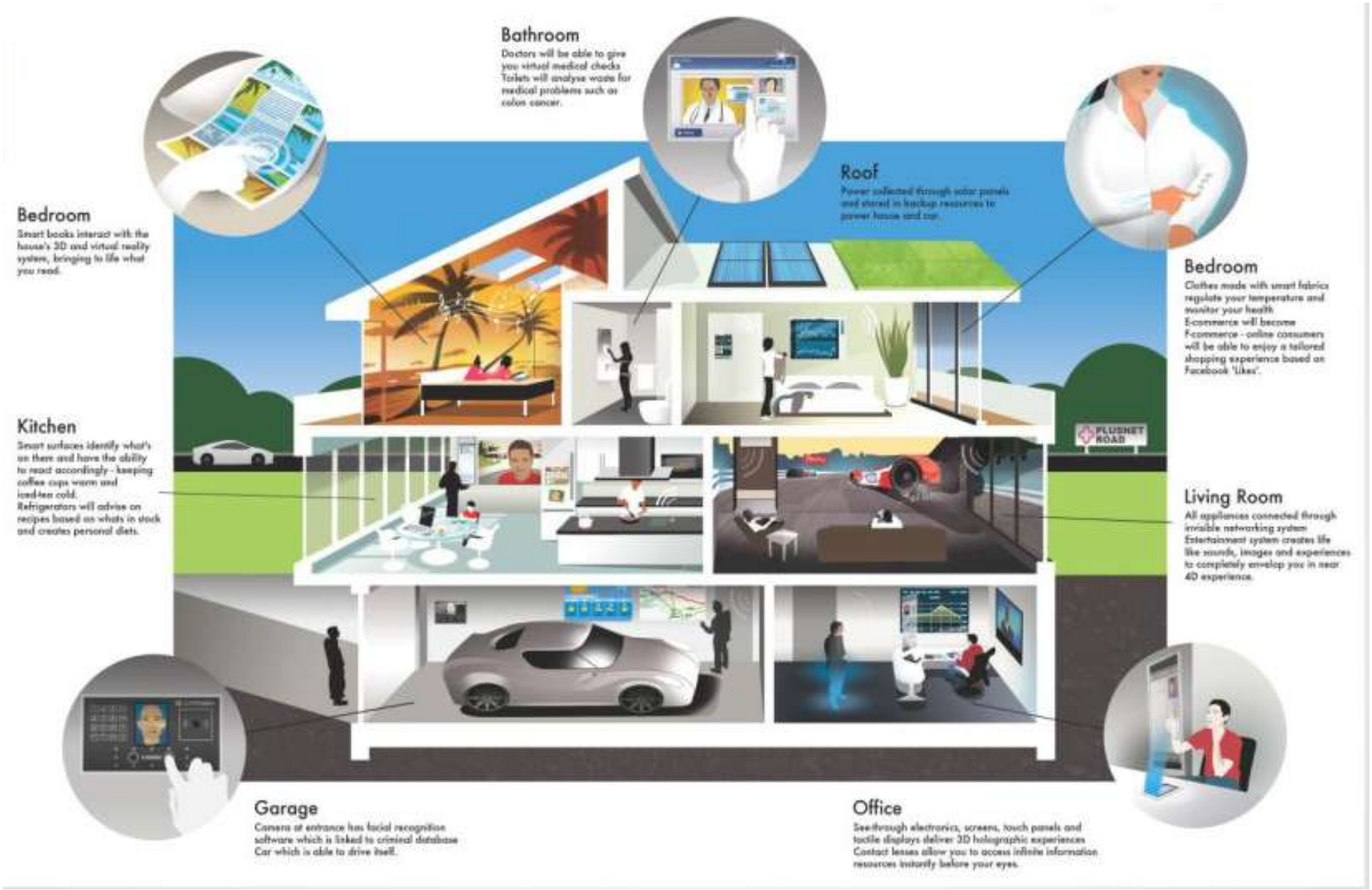
Examples of IOT

- Smart homes
- Smart transportation systems
- Smart healthcare services
- Smart livestock farming
- Smart cities

Smart Home

- A smart home or building is a home or building, usually a new one, that is equipped with special structured wiring to enable occupants to remotely control or program and array of automated home electronic devices by entering a single command.
- For example:
  - a homeowner on vacation can use a Touch-tone
  - phone to arm a home security system, control temperature gauges, switch appliances on or off, control lighting.
  - program a home theatre or entertainment system, and perform many other tasks.
  - Electronic coffee machine

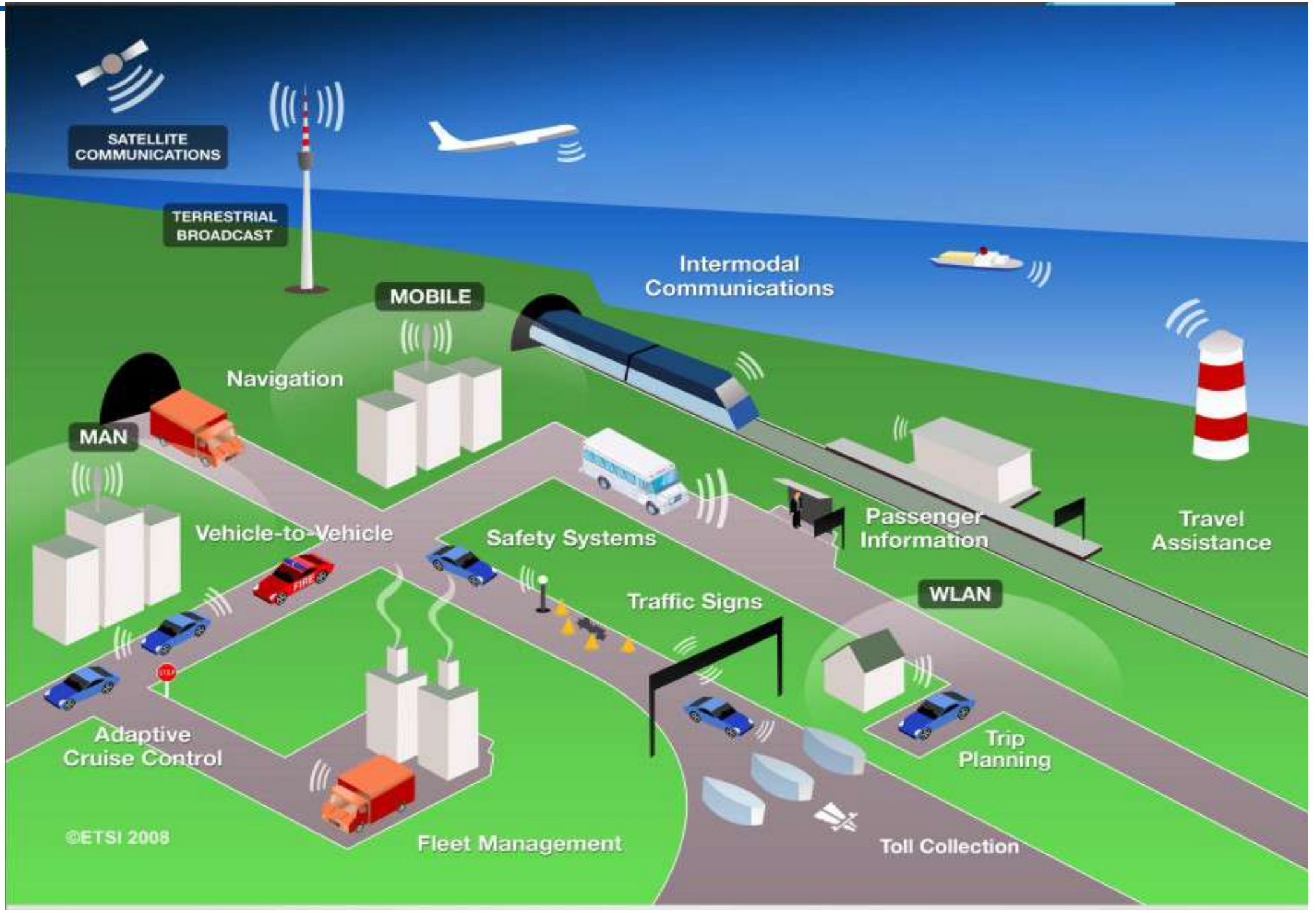
Smart Home


Bathroom
Doctors will be able to give you virtual medical checks
Toilets will analyse waste for medical problems such as colon cancer.
Roof
Power collected through solar panels and stored in backup resources to power house and car.
Bedroom
Smart books interact with the house's 3D and virtual reality system, bringing to life what you read.
Bedroom
Clothes made with smart fabrics regulate your temperature and monitor your health
E-commerce will become F-commerce - online consumers will be able to enjoy a tailored shopping experience based on Facebook 'Likes'.
Kitchen
Smart surfaces identify what's on them and have the ability to react accordingly - keeping coffee cups warm and iced-tea cold.
Refrigerators will advise on recipes based on whats in stock and creates personal diets.
FLUSHET ROAD
Living Room
All appliances connected through invisible networking system
Entertainment system creates life like sounds, images and experiences to completely envelop you in near 4D experience.
Garage
Camera at entrance has facial recognition software which is linked to criminal database
Car which is able to drive itself.
Office
See-through electronics, screens, touch panels and tactile displays deliver 3D holographic experiences
Contact lenses allow you to access infinite information resources instantly before your eyes.

Smart Transportation System

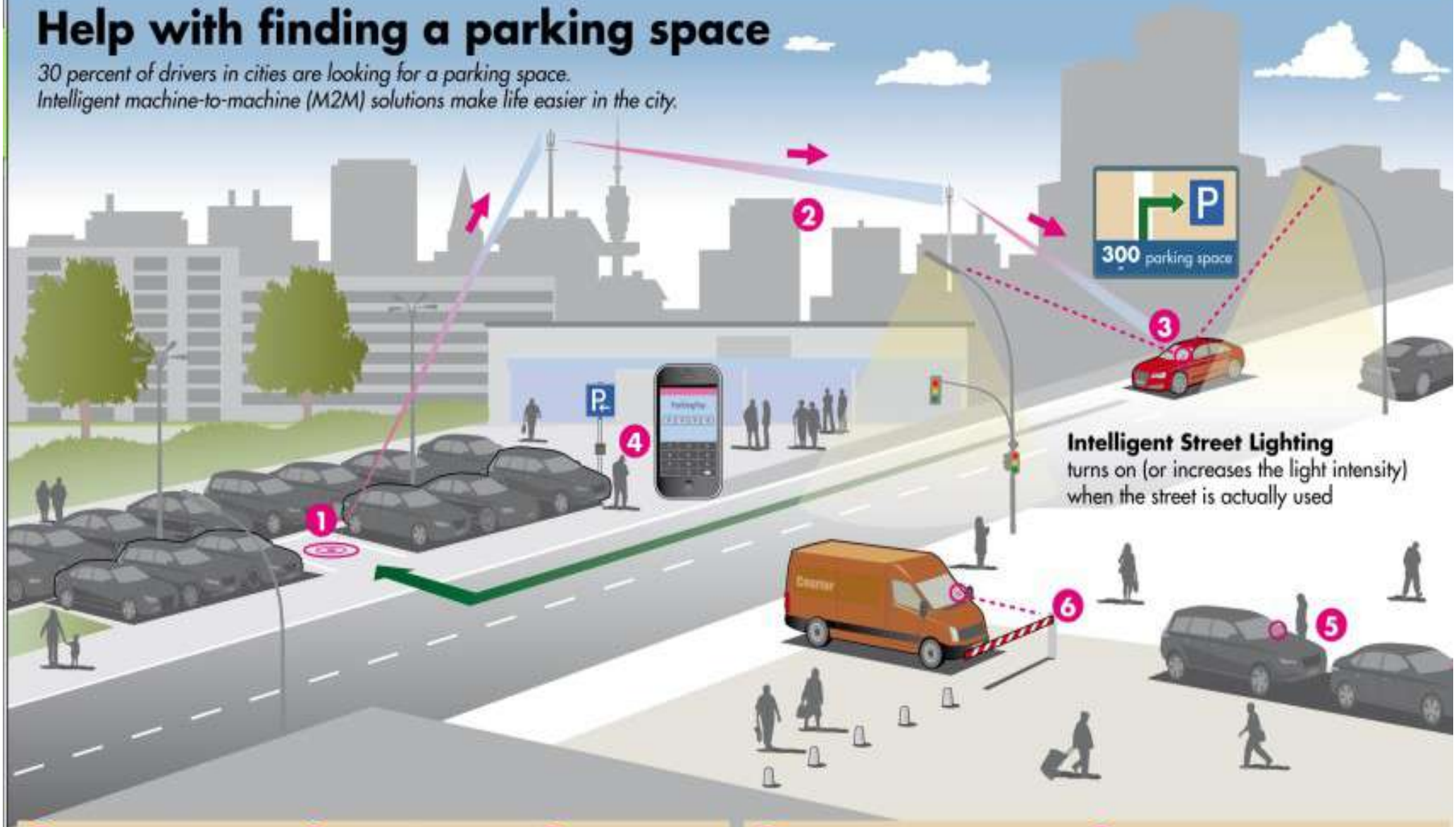
- Intelligent Transport System (ITS) are advanced applications which aim to:
- provide innovative services relating to different modes of transport and traffic management
- enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks.
- Enabling inter and intra vehicular communications
- Making traffic signals smart
- Making parking areas smart
- Making roads intelligent so that warning messages are

Smart Transportation System



Help with finding a parking space

30 percent of drivers in cities are looking for a parking space.
Intelligent machine-to-machine (M2M) solutions make life easier in the city.



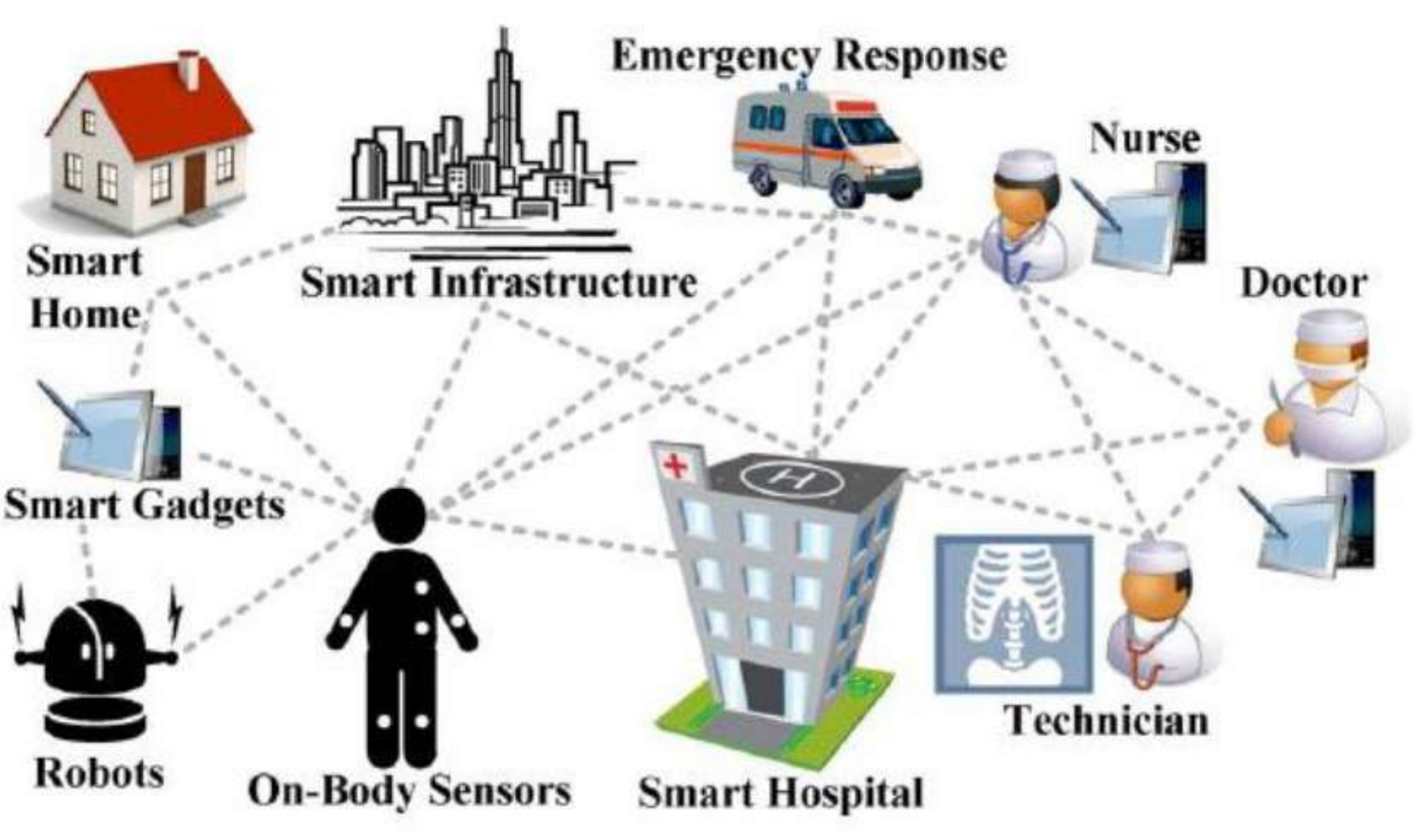
1. **Sensors** "detect" whether a parking space is occupied or vacant and...
2. ... transmit **data to** the central **server**
3. **Smartphone app** "requests" a parking space and guides drivers to the free space
4. **Parking fee** is paid directly through the app
5. **Special permit**
   Administration of
   - parking and local resident IDs
   - permits for taxis, coaches, deliveries
6. **Legitimation**
   Access control to restricted traffic areas such as loading zones, residential parking

Source: Deutsche Telekom

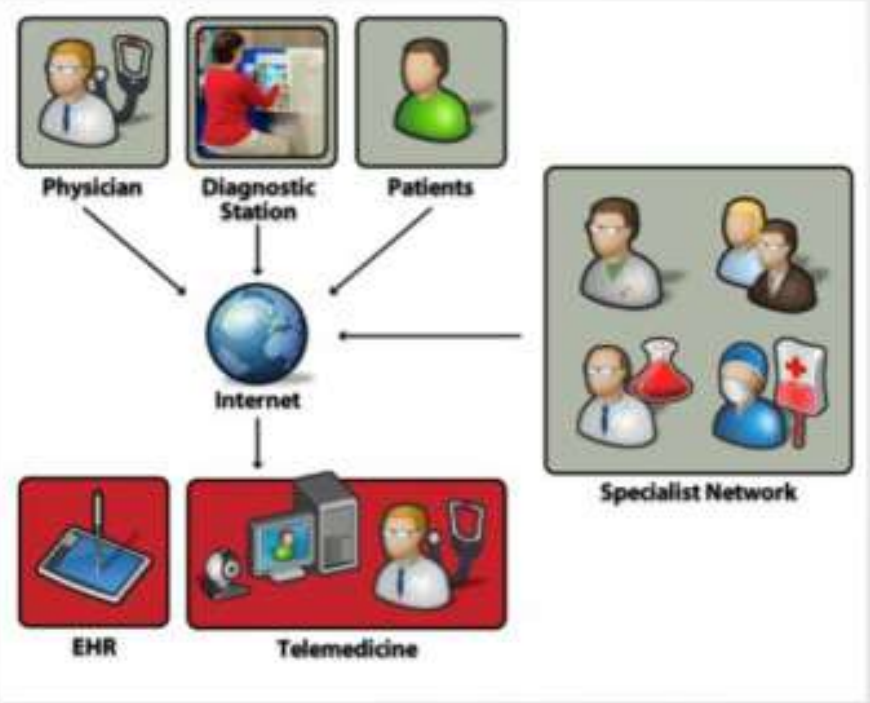
Smart Healthcare Services

- SMART Health platform supports the SMART standard, patients, doctors, and healthcare practitioners improve clinical care, research, and public health.
- Smart Wearables that measures activitites.
- Smart devices with appropriate sensors to measure health care.
- Smart medicine box to prompt to citizens with recurring medication requirements.

Smart Healthcare Services



Smart Healthcare Services



Smart Livestock Farming

- The Internet of Things has the potential to transform farming and food production through improving product quality, increasing crop productivity, aiding in resource conservation, and helping farmers better control costs.
- Gather data on soil quality, moisture levels, and weather conditions in order to effectively plan for optimized harvesting.
- Use weather forecasts to optimize productivity and take preventative measures to decrease chances of crop damage.
- Monitor environmental parameters and plant growth to predict pest behavior and address any pending pest issues before they impact crops.

Smart Cities

- Smart city can be designed by implementing several of the ideas of IOT for living condition of citizens more convenient, safer and enjoyable.

Artificial Intelligence & Smart Machines

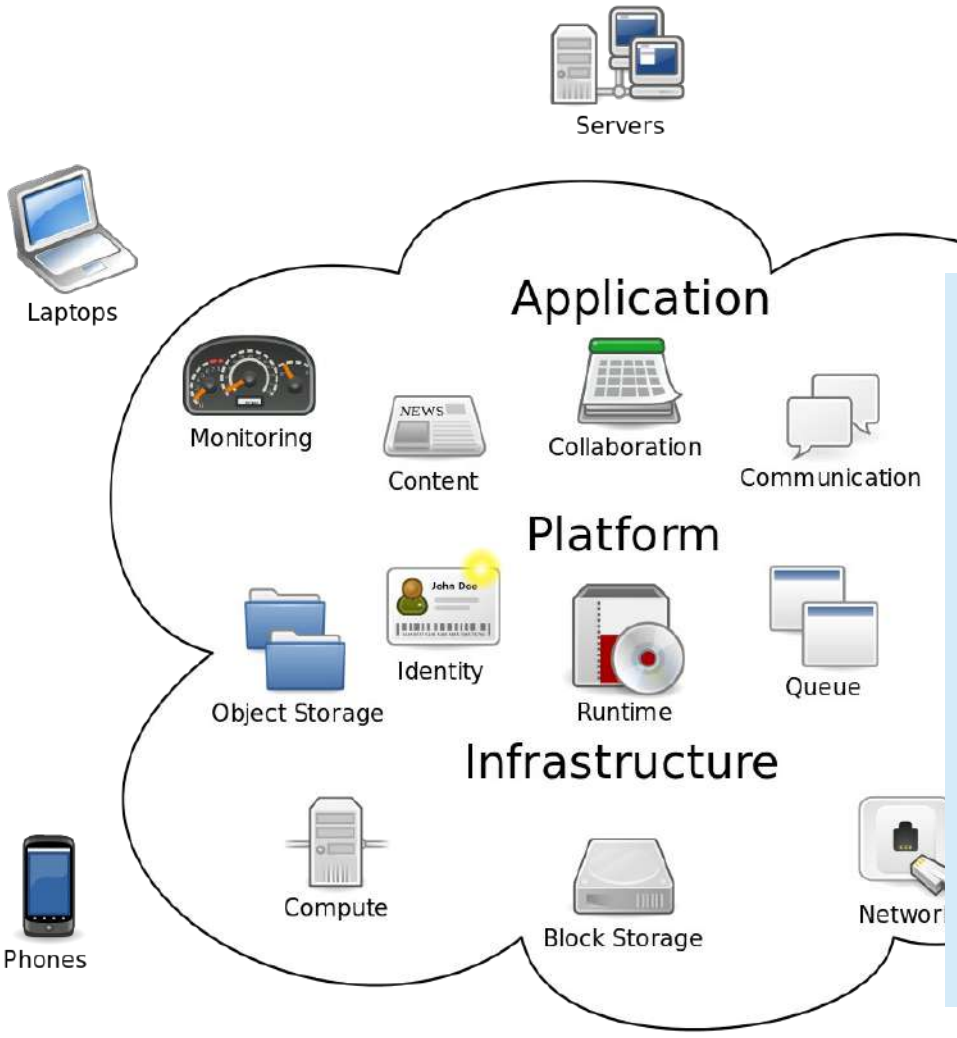
- Artificial intelligence (AI) is wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence.
- AI is an interdisciplinary science with multiple approaches, but advancements in machine learning and deep learning are creating a paradigm shift in virtually every sector of the tech industry.
- Artificial intelligence (AI) makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks.

Cloud Computing

Artificial intelligence is the science of making machines that can think like humans. It can do things that are considered "smart."
Al technology can process large amounts of data in ways, unlike humans. The goal for Al is to be able to do things such as recognize patterns, make decisions, and judge like humans. To do this, we need lots of data incorporated into them.

- Cloud Computing is the delivery of computing services including servers, storage, databases, networking, software, analytics, and intelligence over the Internet

Cloud Computing



Mobile Apps and Computing

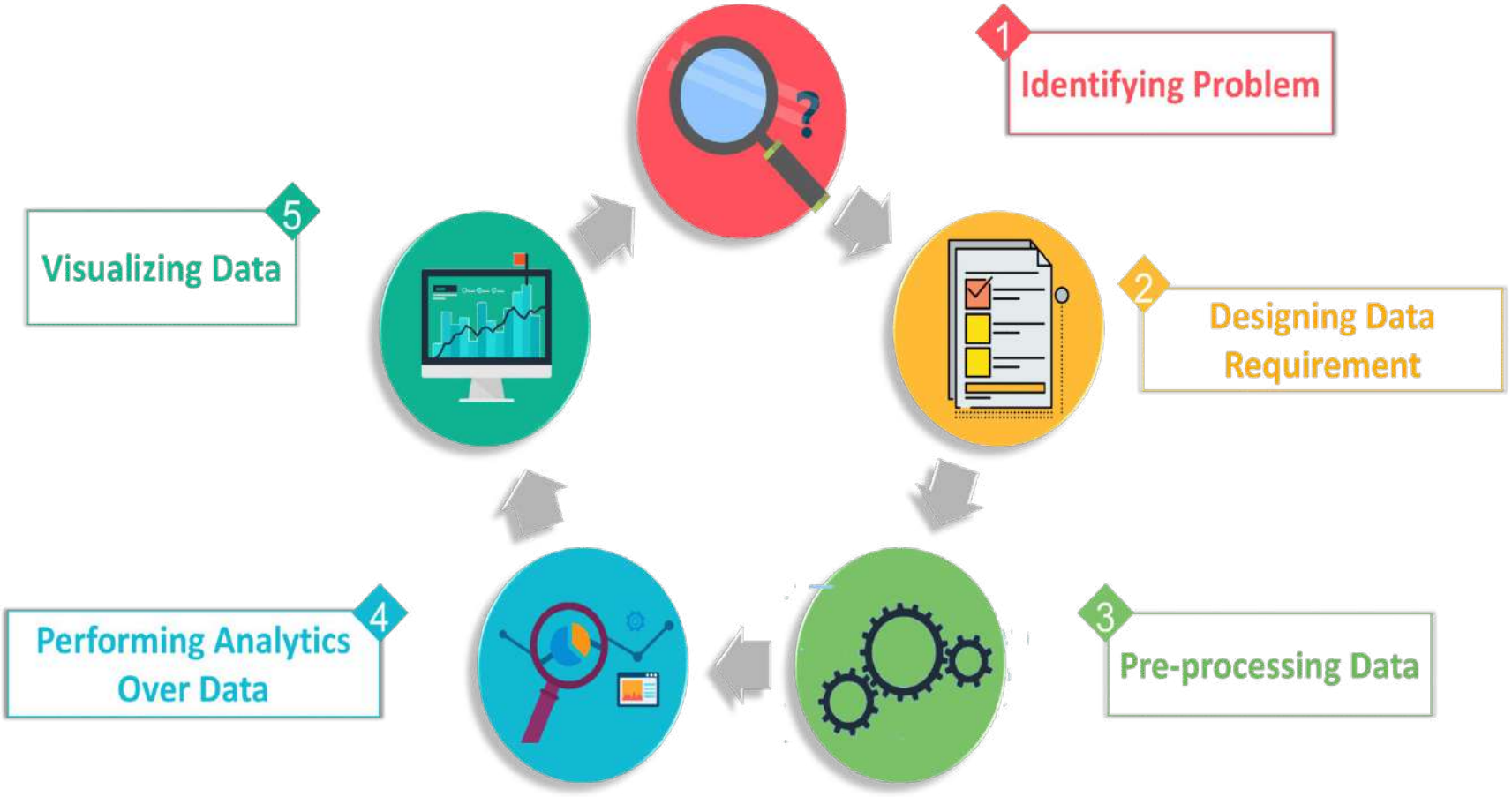
- A mobile application, most commonly referred to as an app, is a type of application software designed to run on a mobile device, such as a smartphone or tablet computer.
- A mobile application also may be known as an app, web app, online app, iPhone app or smartphone app.

Mobile Apps and Computing

- Mobile Computing is a technology that allows transmission of data, voice and video via a computer or any other wireless enabled device without having to be connected to a fixed physical link.

Big Data Analytics

- Big data is a trend that allows businesses to analyze extensive sets of information to achieve variety in increasing volumes and growth of velocity.
- Examination of data to understand markets and strategies is becoming more manageable with advances in data analytics programs.



Automation

- Another current trend in the IT industry is automated processes.
- Automated processes can collect information from vendors, customers, and other documentation.
- Machine learning can enhance these automated processes for a continually developing system.
- Automated processes for the future will extend to groceries and other automatic payment methods to streamline the

Virtual Reality

- Virtual Reality (VR) is the use of computer technology to create a simulated environment.
- VR places the user inside an experience.
- Instead of viewing a screen in front of them, users are immersed and able to interact with 3D worlds.
- Virtual Reality's most immediately recognizable component is the head-mou

WHAT IS VIRTUAL REALITY? Virtual Reality (VR) is a computer-generated environment with scenes and objects that appear to be real, making the user feel they are immersed in their surroundings. This environment is perceived through a device known as a Virtual Reality headset or helmet.

Augmented Reality

- Augmented reality (AR) is an experience where designers enhance parts of users' physical world with computer-generated input.
- Augmented reality is the technology that expands our physical world, adding layers of digital information onto it.
- AR does not create the whole artificial environments to replace real with a virtual one.
- AR appears in direct view of

Augmented reality (AR) is an enhanced version of the real physical world that is achieved through the use of digital visual elements, sound, or other sensory stimuli and delivered via technology. It is a growing trend among companies involved in mobile computing and business applications in particular.

Blockchain

- Blockchain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system.
- A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain.
- Each block in the chain contains a number of transactions, and every time a new transaction occurs on the blockchain, a record of that transaction is added to every participant's ledger.

Blockchain