



edunet  
foundation



## Unit 1

# Internet of Things



## **Disclaimer**

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## Learning Objectives

- Industrial Revolution
- Internet Usage and Population Statistics
- What is Internet of Things?
- Why IoT?
- Embedded System – Heart of IoT
- IoT Architecture
- Top IoT platforms
- Where IOT is used? How?
- IoT Applications
- Industrial IoT
- Applications of IIoT
- Future of IoT

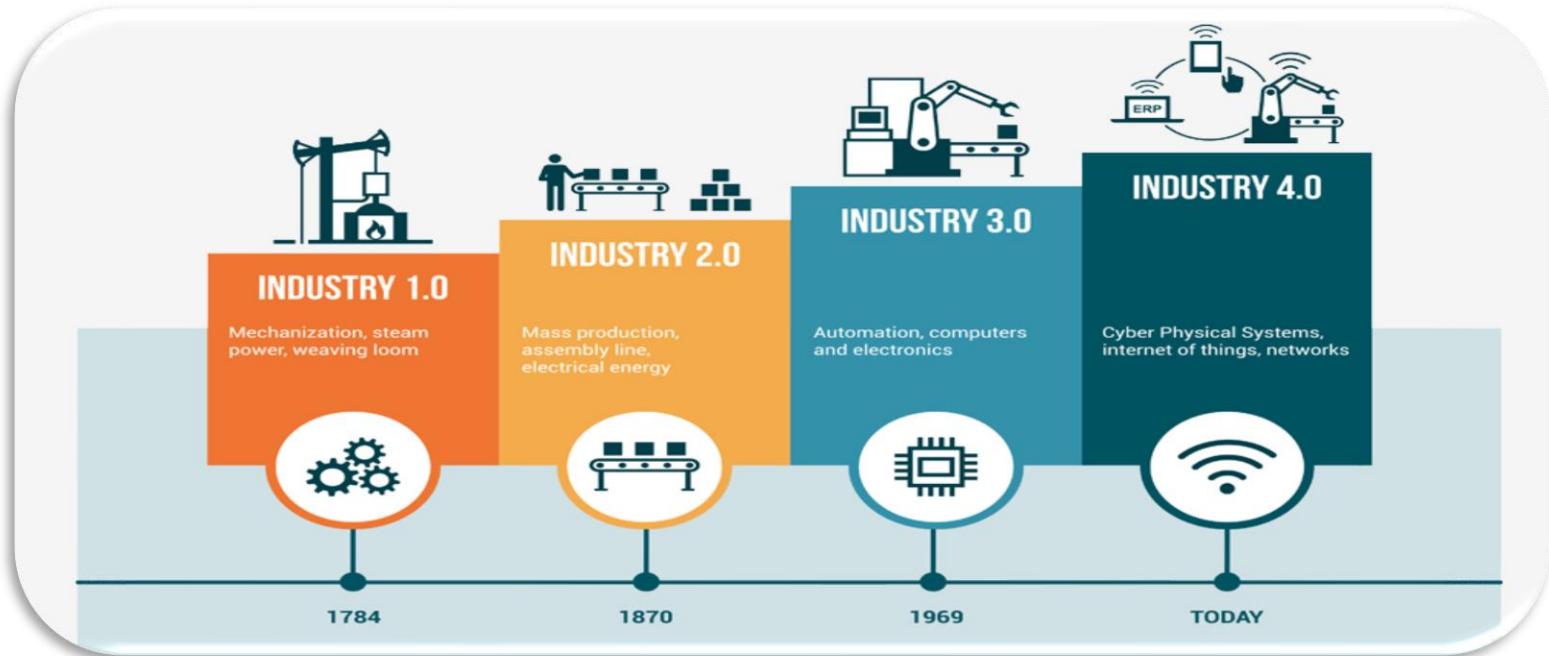


## Industrial Revolution



Source : [Blue Ocean Data Solution/](#)

## Industrial Revolution



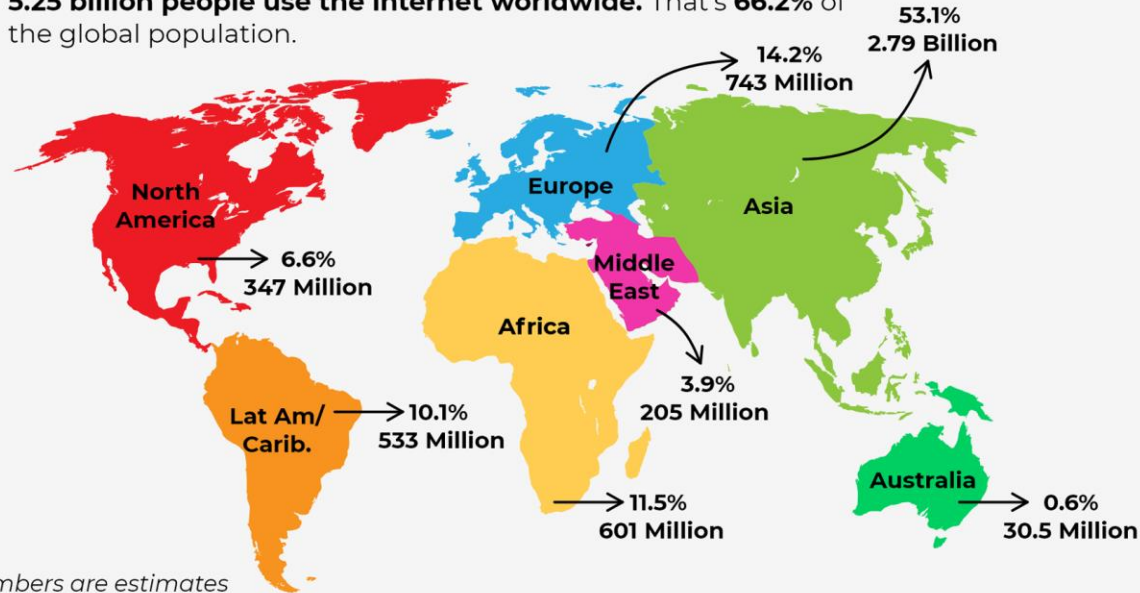
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## Internet Usage and Population Statistics

### Total Internet Users Worldwide Statistic

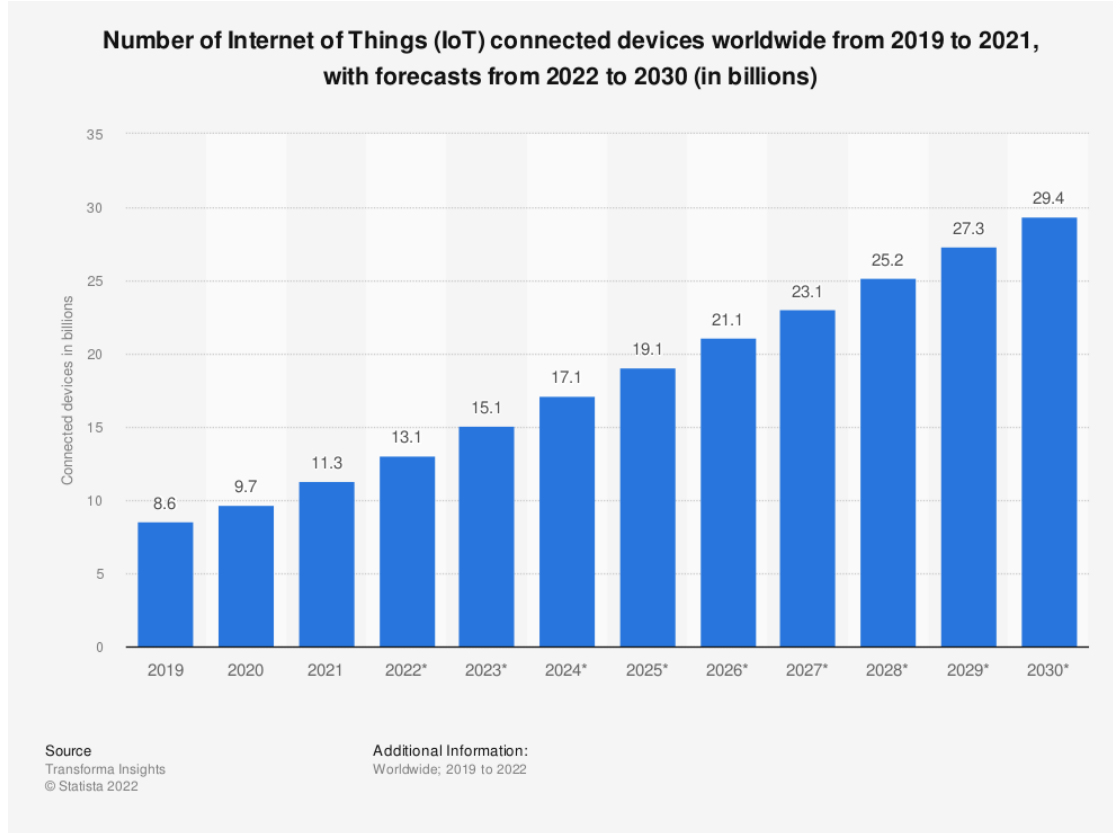
5.25 billion people use the internet worldwide. That's 66.2% of the global population.



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## Number of IoT connected Devices



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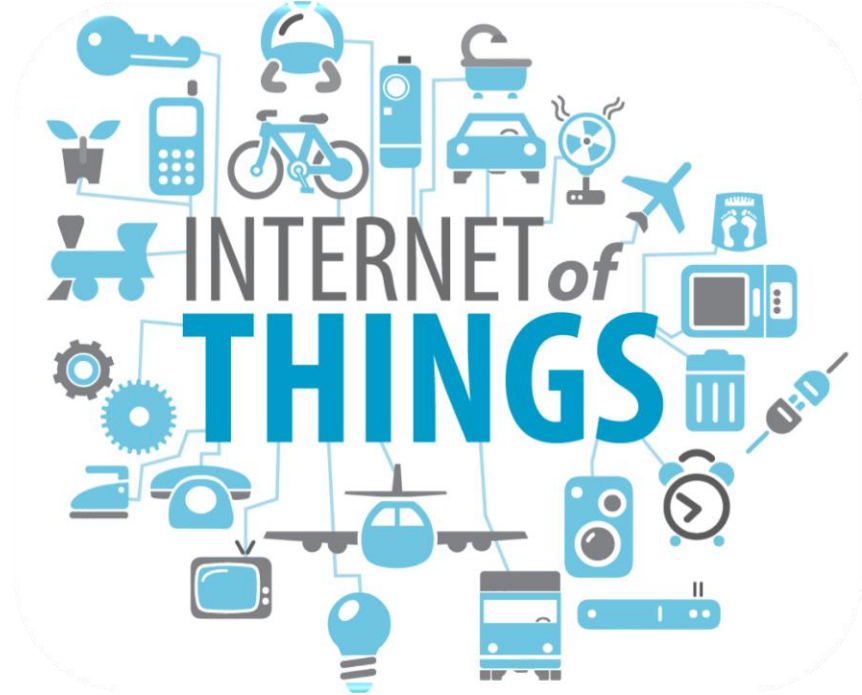
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Reference link

## Why IoT?

- We want to receive more data
- We want to control stuff
- We want to automate
- We want to make things faster

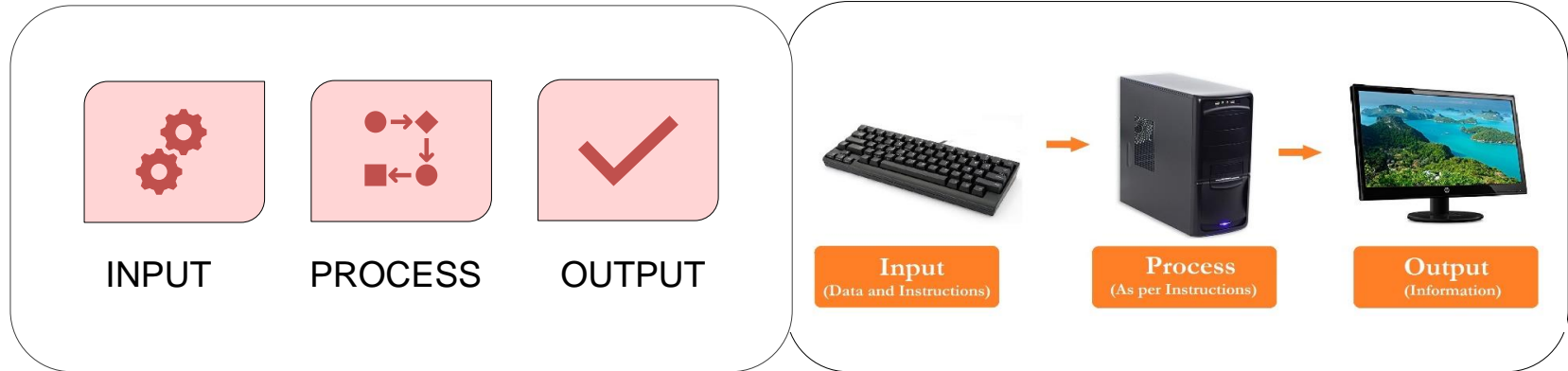


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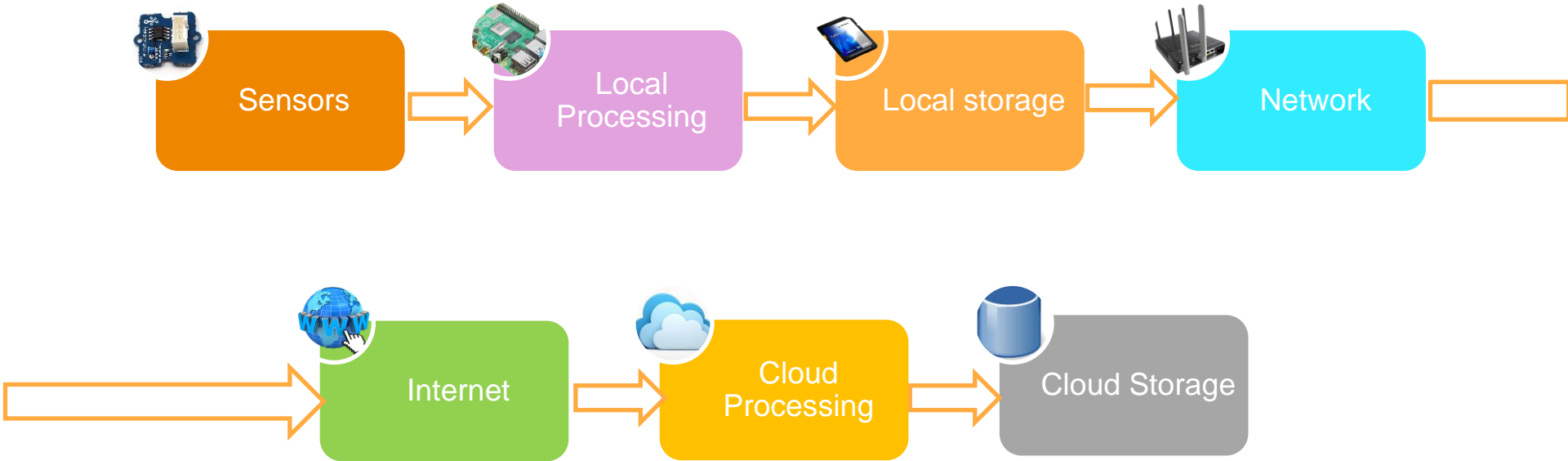
## Embedded System - Heart of IoT

**HARDWARE + SOFTWARE**



IoT = Embedded System with internet connectivity which enables to share data with other devices used around human environment

## IoT Architecture



## Sensors

- They transform Analog data given
- from scanning the environment to digital
- data, but they merely do any processing
- Sensor perform following task
- Measure values
- Send raw data
- Low power



## Local Processing and Local Storage

- Get data from sensors
- Data Process
- Send some data to Edge/Fog Computing devices



## Network and Internet

- IoT Gateway
- Protocols
  - CoAP
  - MQTT
  - HTTP
  - XMPP
- If you've ever turned your lights on from your phone or told Alexa to play your favorite song, you've experienced the power of an IoT network. But IoT networks do a lot more, especially for big businesses.



## Cloud Processing and Storage

- Aggregate Data
  - Storage
  - Inferences
- Here are some benefits that cloud storage offer to a business willing to adopt the technology of Internet of Things:
1. Secure Data Storage
  2. Adaptable to Changing Business Needs
- Cloud storage provides high scalability and flexibility in this sense. A company can buy a new or updated package on a cloud to increase its data storage capabilities.



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## Top IoT platforms



Cumulocity IoT Platform



Microsoft Azure IoT Suite



Google Cloud's IoT Platform



AWS IoT Platform



Cisco IoT Cloud Connect



Oracle IoT Platform

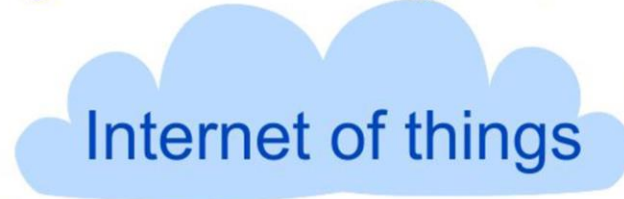


IBM Watson IoT Platform



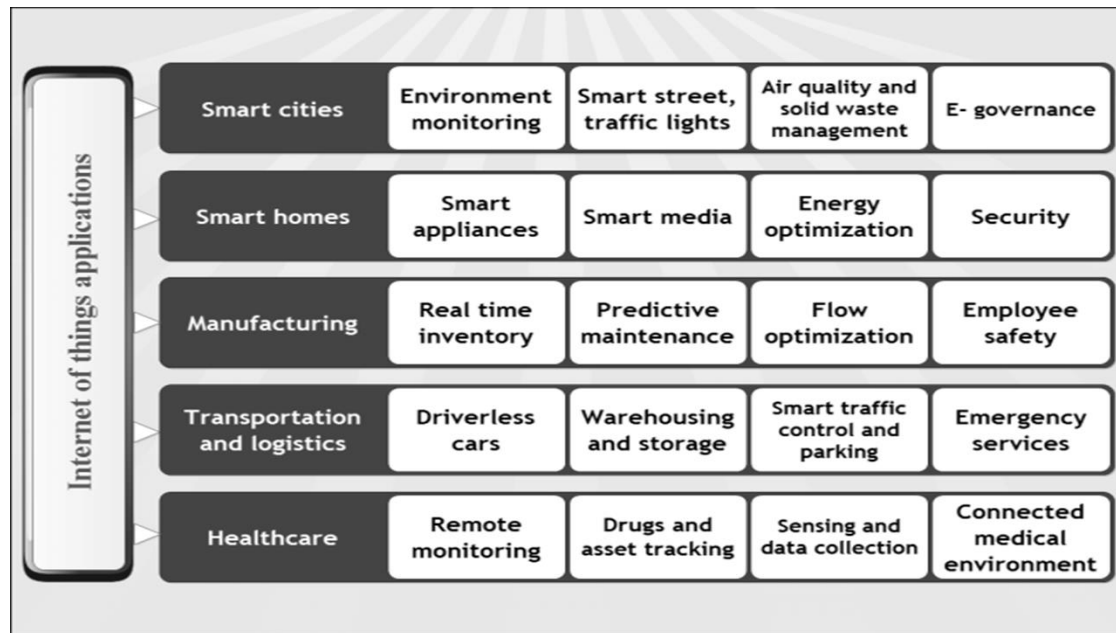
SAP CLOUD PLATFORM SERVICE:  
INTERNET OF THINGS

## Where IOT is used? How?

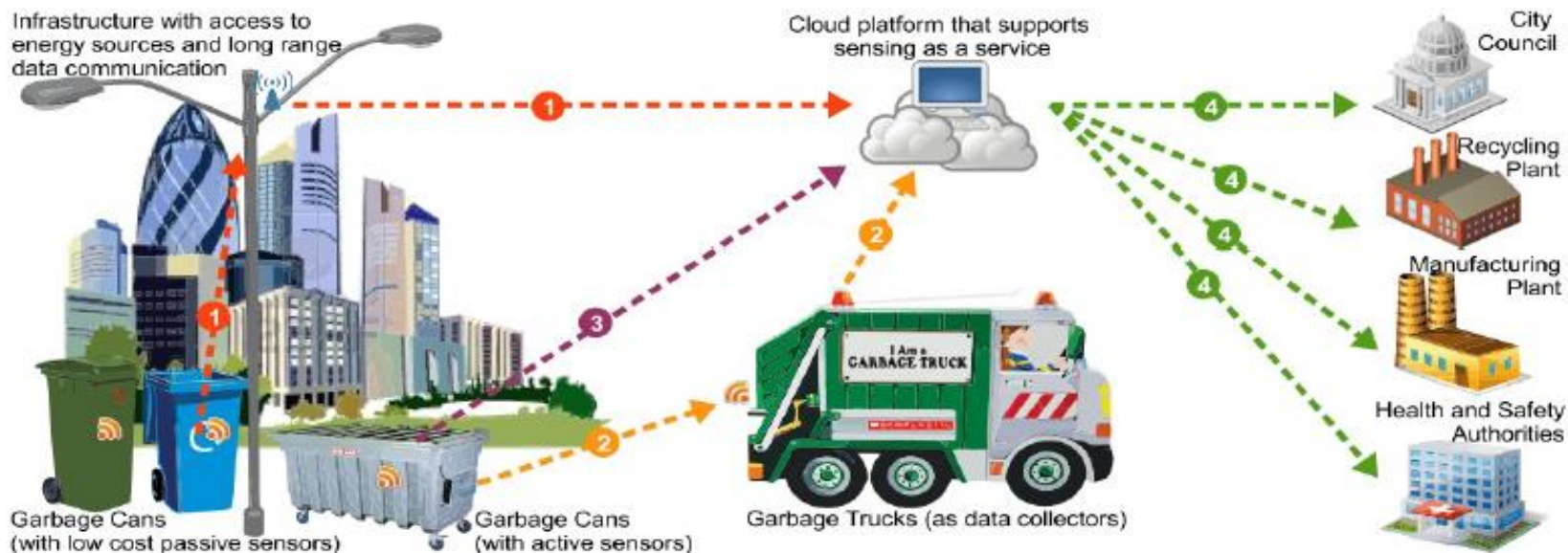


## IoT Applications

- Agriculture
- Consumer use
- Health care
- Insurance
- Manufacturing
- Retail
- Transportation
- Utilities/Energy



## Efficient Waste Management in Smart Cities Supported by the Sensing-as-a -Service



[Source: "Sensing as a Service Model for Smart Cities Supported by Internet of Things", Charith Perera et. al., Transactions on Emerging Telecommunications Technology, 2014]

## Smart Parking System

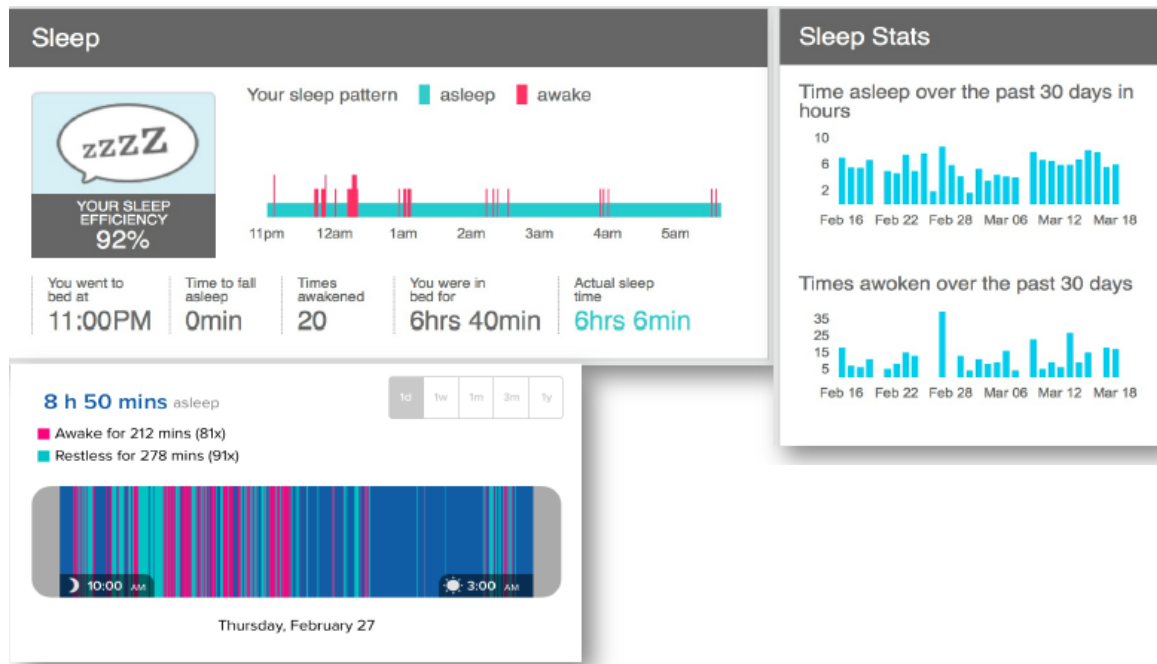
- Create USD 41 Billion by providing visibility into the availability of parking spaces across the city.

Create **USD 41 Billion** by providing visibility into the availability of parking spaces across the city.



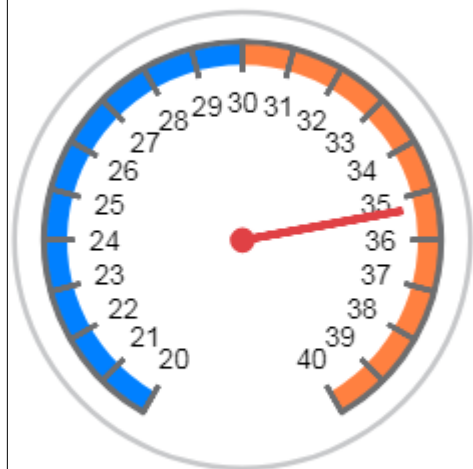
Residents can identify and reserve the closest available space, traffic wardens can identify non-compliant usage, and municipalities can introduce demand-based pricing.

## How well do I Sleep?



## Weather Monitoring

### Temperature



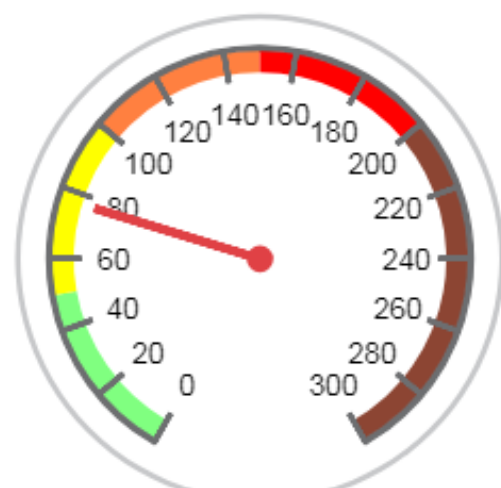
35.3  
Celsius

### Humidity



35.3  
%

### Air quality index



77  
AQI



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## Limbayat

AQI

0

GOOD

21 °C

64 %

Last updated: in 26443212  
minutes

CO2 0 ppm

CO 0 ug/m3

NO2 0 ug/m3

NO 0 ug/m3

SO2 0 ug/m3

PM2.5 0 ug/m3

PM10 0 ug/m3

## Varachha

AQI

102

MODERATELY

POLLUTED

35 °C

50 %

Last updated: in 12 minutes

CO2 0 ppm

CO 2.13 ug/m3

NO2 0 ug/m3

NO 37.01 ug/m3

SO2 50.93 ug/m3

PM2.5 48.28 ug/m3

PM10 98.93 ug/m3









# Surat Municipal Corporation

## SURAT RAINFALL DETAILS

Welcome to Surat Municipal Corporation's Mobile Application

Date/Time	Ukai Dam Outflow (Cuses)	Ukai Dam Level (ft)	Causeway Level (mt)
03/09/2015 20:00	11970.0	333.35	5.32
03/09/2015 14:00	11950.0	333.40	5.32
03/09/2015 08:00	6473.0	333.45	5.32
02/09/2015 20:00	11980.0	333.47	5.33
02/09/2015 14:00	1000.0	333.50	5.34
02/09/2015 08:00	11960.0	333.50	5.34
01/09/2015 20:00	9261.0	333.46	5.34
01/09/2015 14:00	11962.0	333.47	5.34
01/09/2015 08:00	6272.0	333.47	5.34
31/08/2015 20:00	11790.0	333.54	5.34

Ukai Full reservoir Level:345 ft

Cusec Way Overflow Level:6.0 mt

\*Source:Irrigation Dept./Collector Office





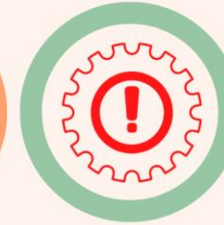
## What is the Industrial Internet of things (IIoT)?

- The industrial internet of things (IIoT) refers to the extension and use of the internet of things (IoT) in industrial sectors and applications.
- With a strong focus on machine-to-machine (M2M) communication, big data, and machine learning, the IIoT enables industries and enterprises to have better efficiency and reliability in their operations.
- The IIoT encompasses industrial applications, including robotics, medical devices, and software-defined production processes.

### Benefits of IOT in Industrial Business



Machine to  
Machine  
Communication



Predicting  
Failure



Improved  
Product Quality

BUSINESS APPLICATIONS OF INTERNET OF  
THINGS IN TEXTILE AND DIAMOND INDUSTRY



## Applications of Industrial Internet of Things(IIoT)

### IoT In Textile Manufacturing



Business applications of internet of things in  
textile and diamond industry

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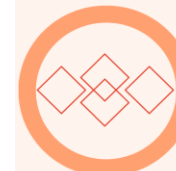
[Reference link](#)

## Applications of Industrial Internet of Things(IIoTT)

### IoT In Diamond Industry



#### IOT In Diamond Industry



Diamond  
Sorting



Remote  
Monitoring



Quality  
Control



Predictive  
Maintenance



Smart  
Retail













Traceability

Business applications of internet of things in  
textile and diamond industry

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## IoT Technology Trends in 2022

- 1  IoT is developing into a crucial technology for sustainability
- 2  The platform hype is moving from cloud to the edge
- 3  IIoT initiatives are transforming manufacturing
- 4  Cloud-Native applications are on the rise
- 5  Hyperautomation is transforming operations
- 6  AI is increasingly found at the (Thin) Edge
- 7  "Invisible AI" adoption is happening right under our noses
- 8  Immersive realities (VR/AR) are entering the enterprise environment
- 9  5G is becoming "IoT ready"
- 10  Secure remote access of assets is growing in importance



## Summary

In this session we have learned –

- some insights of Industrial revolutions , Usage of internet and its Population stats
- Then we have learned about what IOT, what is Embedded system
- Then we have seen Architecture of IOT and How it works
- Some top IOT Platforms and Application of IOT
- Then we have learned about What is Industrial IOT and its Applications and last Future of IOT



## QUIZ

1. What is the primary goal of IoT?
  - A. Creating artificial intelligence
  - B. Connecting people to the internet
  - C. Connecting everyday objects to the internet
  - D. Establishing virtual reality experiences

**Answer:** c) Virtual reality headsets

## QUIZ

1. Which of the following is NOT a component of IoT?
  - A. Devices with sensors
  - B. Cloud computing
  - C. Virtual reality headsets
  - D. Data analytics

**Answer:** c) Connecting everyday objects to the internet

## QUIZ

1. What does "local processing" refer to in the context of computing?
  - A. Processing data in a foreign country
  - B. Processing data on a centralized server
  - C. Processing data on the device where it is generated
  - D. Processing data using cloud computing

**Answer:** c) Processing data on the device where it is generated

## QUIZ

1. What is the primary function of a sensor?
  - A. Generate electricity
  - B. Process data
  - C. Detect and measure physical quantities
  - D. Provide internet connectivity

**Answer:** c) Detect and measure physical quantities

## QUIZ

1. What is the main purpose of IoT devices?

- A. Sending emails
- B. Making phone calls
- C. Sharing data and information
- D. Playing games

**Answer:** c) Sharing data and information

## Reference

- <https://www.broadbandsearch.net/blog/internet-statistics>
- <https://www.cloudcredential.org/blog/knowledge-byte-building-blocks-of-iot-architecture/>
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Thank you...!