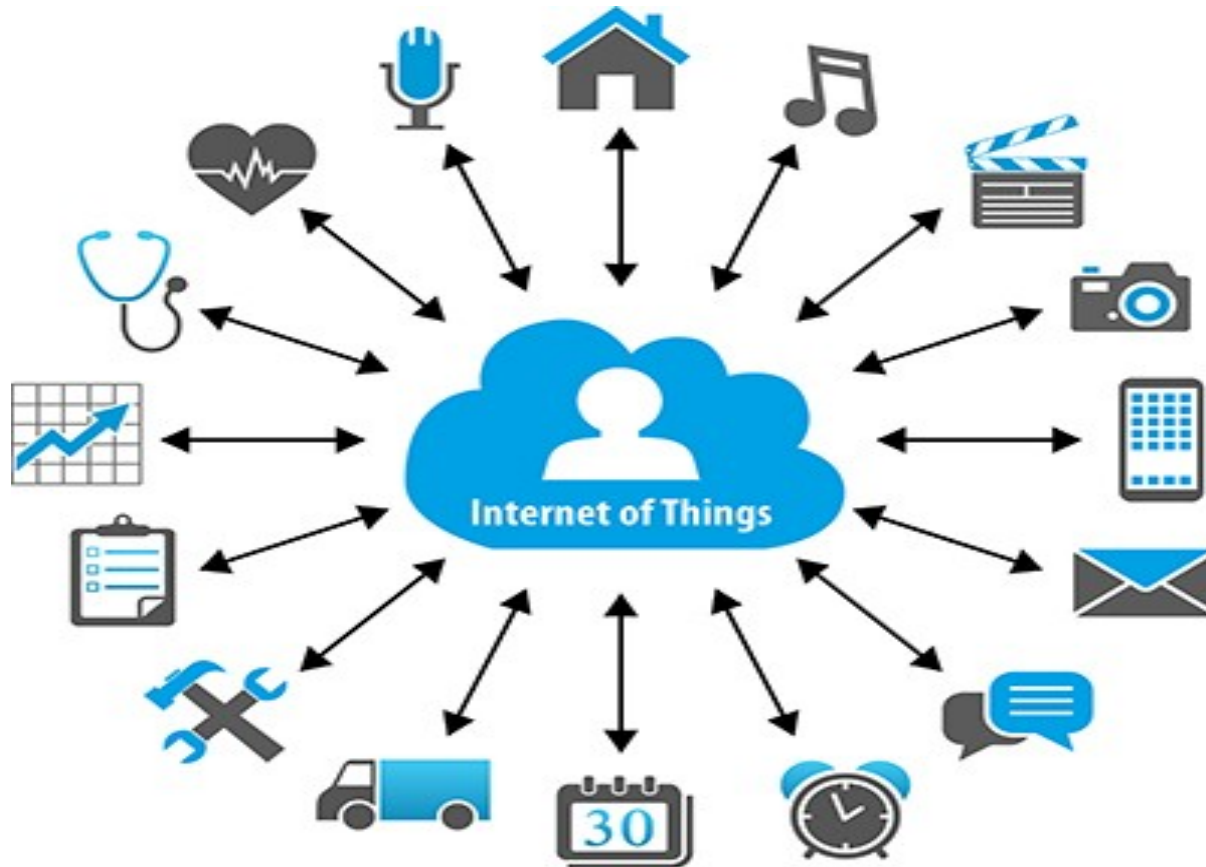


Internet of Things (IOT)

IOT - Introduction

- Network of Various objects, devices, vehicle, building etc.
- Embedded with processor, software, sensor and internet connectivity.
- Able to send and receive data over the internet.

IOT - Introduction



IOT - Introduction

Refer to wide variety of devices

- Person with heart monitoring implant.
- A farm with biochip transponder.
- An automobile that alert driver or send data information to manufacturer.
- Any other things which can be connected to internet for transferring of data.

IOT - Examples

- Smart Thermostate System that connect to smart phone via wi-fi and internet to control Home AC and heating systems.
- Coke machine at Carnegie Mellon University internet-connected appliance, able to report its inventory that newly loaded drinks were cold.

IOT

The Internet of Things (IoT) is an environment in which interconnected things with unique identifier over internet are provided are able to transfer data over a network without requiring human-to-human or human-to-computer interaction.

IOT Technologies

- Amalgamation of multiple technologies
- Wireless communication to the internet.
 - RFID and near-field communication.
 - Bluetooth low energy (BLE).
- Embedded system.
- Micro-electromechanical System (MEMS)

Evaluation of IOT

- 1982 : Coke machine at Carnegie Mellon University was first internet-connected appliance, able to report its inventory that loaded drinks were cold.
- 1990 : Connected devices to internet was a Toaster.
- 1999 : IOT first became popular, when Kevin Ashton founded Auto-ID center at MIT.

Evaluation of IOT

- 1999 : First Machine-to-Machine IOT protocol developed by IBM. It is called MQ elementry Transport (MQTT).
- 2000 : LG announced the plan for first internet Refrigerator.
- 2002 : Ambient Orb was released , which displays Dow Jones, personal finance and weather information based on internet data.

Evaluation of IOT

2005 : The UN first mentioned IOT in a published ITU report : “A new dimension has been added to the world of information and communication ...from any time any place connectivity for anyonefor anything. Connections will multiply and create an entirely new dynamic network of networks – an Internet of Things.”

Evaluation of IOT

2008 : IPSO (*Identity and Privacy for the Next Generation of Smart Objects*) alliance launches to promote the use of Internet Protocol(IP) in connected devices.

2011 : Ipv6 was launched. It allows around 340 undecillion (340×10^{36}) IP address. With this every object on the earth surface would be assigned unique identity and will still have left enough addresses.

Evaluation of IOT

2013 : Intel launched IOT solution group to build common standards and protocols, helping to ensure “things” operate with the cloud and everything in between

Applications of IOT

Home Automation:

- ◆ Centralized control of lighting, HVAC (Heater, ventilation, AC), appliances.
- ◆ Device may be connect through home network to allow controlled from remote place through Internet.

Applications of IOT

Smart Transportation

Car navigation, traffic signal control system, automatic number plate recognition , Speed camars etc.

Applications of IOT



RFID E-ZPass reader attached to the pole and its antenna (right) used in traffic monitoring in New York City by using vehicle re-identification method

Applications of IOT

Smart City:

Integration of various technological solution to interconnect various information systems of departments of the city.

Hospitals, Transportation system, Traffic and parking management system, Schools. etc.

Applications of IOT

Environmental monitoring

monitoring air or water quality, atmospheric or soil conditions, monitoring the movements of wildlife and habitats.

Energy Management

Integration of sensing and actuation systems, connected to the Internet, is likely to optimize energy consumption as a whole.

IOT – Connected Devices

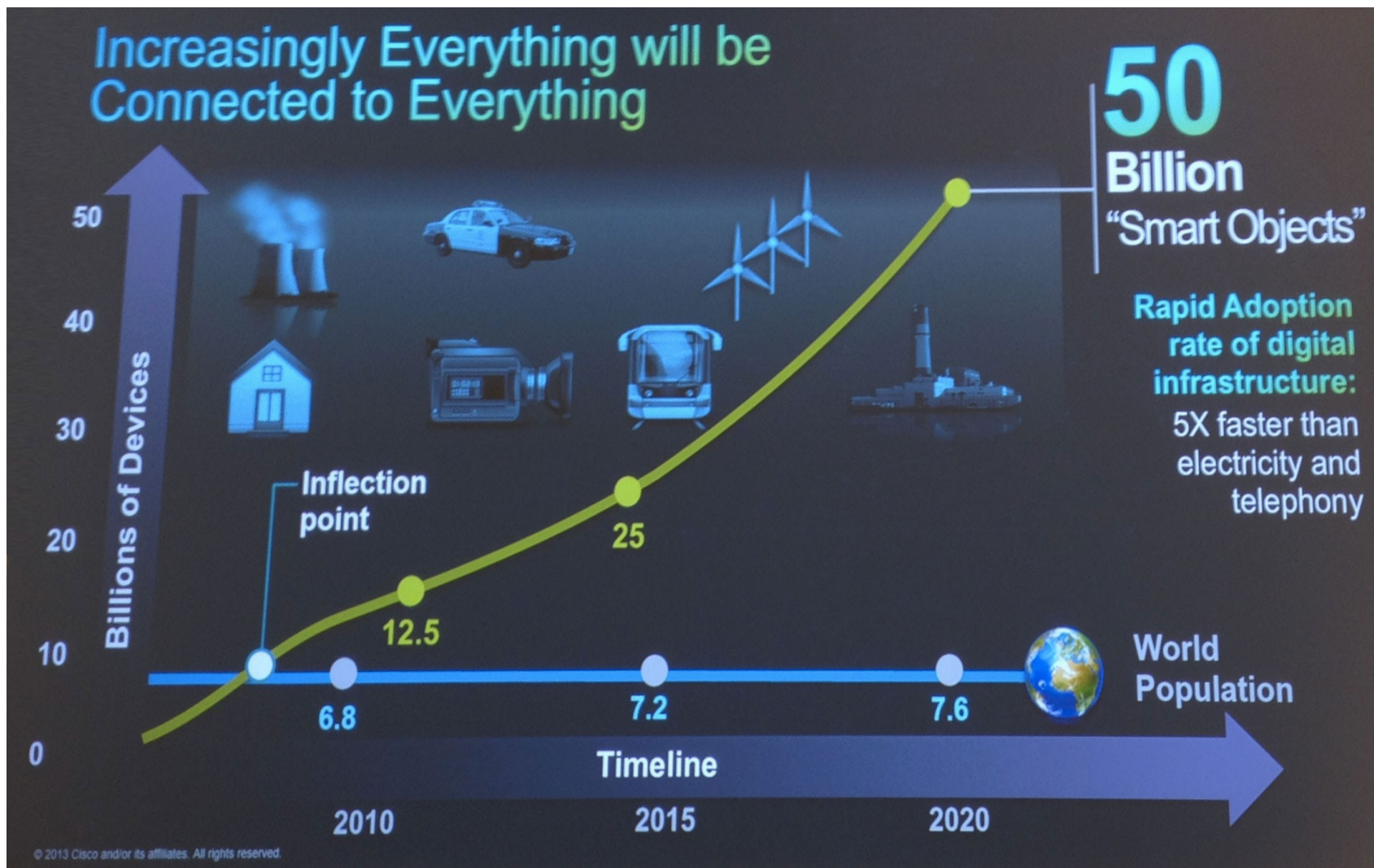
Connected Devices per 100 inhabitants in 2015.

1	Korea	-	37.9
4	USA	-	24.9
12	UK	-	13.0
16	Japan	-	8.2
20	China	-	6.2
24	India	-	0.6

IOT - Future

- ✓ According to Gartner, Inc. (a technology research and advisory corporation), there will be nearly 26 billion devices on the Internet of Things by 2020.
- ✓ ABI Research estimates that more than 30 billion devices will be wirelessly connected to the Internet of Things by 2020.

IOT - Future



6-Feb-2016

Vivek Gupta, CDGI Indore

IOT - Future

As per survey and study done by Pew Research Internet Project, a large majority of the technology experts and Internet users agree that IOT will have widespread and beneficial effects by 2025.

- ✓ The UK Government, in their 2015 budget, allocated £40,000,000 towards research into the Internet of Things.

IOT - Future

CISCO study says IOT can create Saving Over the next Decade.

- Smart buildings are poised to generate \$100B by lowering operating costs by reducing energy consumption through the integration of HVAC and other systems.
- Gas monitoring could generate \$69B by reducing meter-reading costs and increasing the accuracy of readings for citizens and municipal utility agencies.

IOT - Future

- Smart parking could create \$41B by providing real-time visibility into the availability of parking spaces across a city. Residents can identify and reserve the closest available space, traffic wardens can identify non-compliant usage, and municipalities can introduce demand-based pricing.
- Water management could generate \$39B by connecting the household water meter over an IP network to provide remote information on use and status.

IOT - Devices

Connected devices commercially available

- Smart Thermostat – Control AC, Heating system from smart phone
- Parking Sensors – Use to identify real time availability of space in parking.
- Indoor air quality monitor - Monitors the air quality of home or office and sends alerts via the smartphone app. .

IOT - Devices

- Samsung's Connected Screen - TV of future. without cable a screen.
- August's Doorbell cam - Detects motion from visitors, identifies people at the door and sends an instant alert to smartphone.
- Chromecast – Make TV smart, Use phone, tablet or laptop to play, pause and adjust the volume

IOT – In News

- ◆ Microsoft creates Azure hub for Internet of Things. simple bridge between its customers' devices with their systems in the cloud.
- ◆ Cisco has made a significant cellular IoT play by wholly acquiring specialist mobility and M2M vendor Jasper.
- ◆ US chip giant Intel has unveiled a suite of tech tools designed specifically for the retail market, including a new IoT platform. The Intel Retail Sensor Platform is based on the Intel IoT Platform,

IOT - Summary

- IOT is M2M communication to make human life smarter.
- IOT is next stage of the information revolution .
- IOT will have inter-connectivity of everything from transport to medical device to household appliances.
- IOT facilitates creation of new type of smart applications and services.

“Internet of Everything”