

# Chapter 1: What Is IoT?

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Genesis of IoT

IoT and Digitization

IoT Impact

In transportation

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Convergence of IT and OT

IoT Challenges

IoT is a technology transition in which devices will allow us to sense and control the physical world by making objects smarter and connecting them through an intelligent network.

- The basic premise and goal of IoT is to “connect the unconnected.” (objects that are not currently joined to a computer network, namely the Internet, will be connected so that they can communicate and interact with people and other objects).
- Allows for improvements in the areas of efficiency, accuracy, automation, and the enablement of advanced applications.
- Instead of viewing IoT as a single technology domain, it is good to view it as an umbrella of various concepts, protocols, and technologies,

## Genesis of IoT

- The person credited with the creation of the term “Internet of Things” is Kevin Ashton.

**Table 1-1 Evolutionary Phases of the Internet**

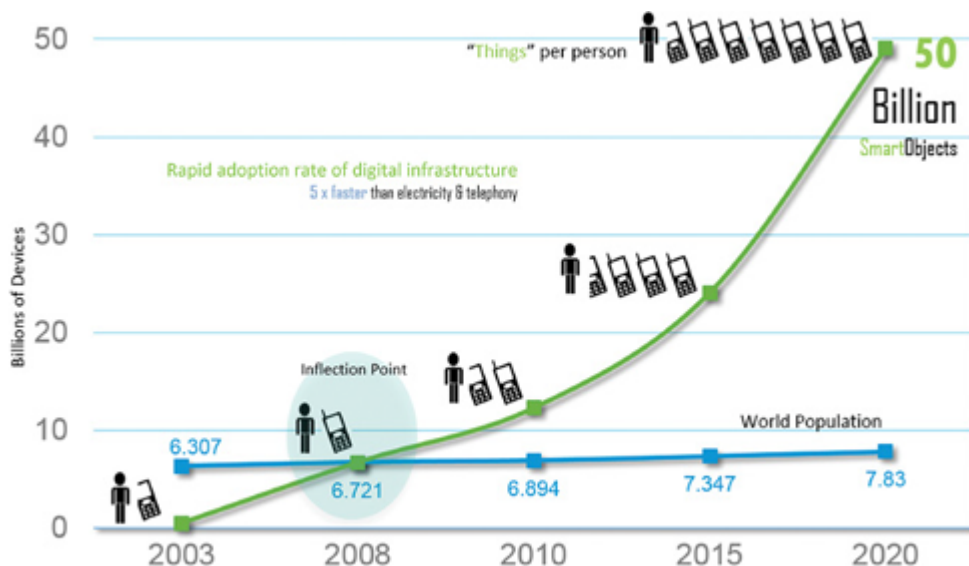
Internet Phase	Definition
Connectivity (Digitize access)	This phase connected people to email, web services, and search so that information is easily accessed.
Networked Economy (Digitize business)	This phase enabled e-commerce and supply chain enhancements along with collaborative engagement to drive increased efficiency in business processes.
Immersive Experiences (Digitize interactions)	This phase extended the Internet experience to encompass widespread video and social media while always being connected through mobility. More and more applications are moved into the cloud.
Internet of Things (Digitize the world)	This phase is adding connectivity to objects and machines in the world around us to enable new services and experiences. It is connecting the unconnected.

## IoT and Digitization

Textbook is too long cannot be bothered

- IoT focuses on connecting “things,” such as objects and machines, to a computer network, such as the Internet.
- Digitization is the conversion of information into a digital format.
- Over time, the term IoE has been replaced by the term digitization.
- IoT is a prime enabler of digitization.

## IoT Impact



**Figure 1-2 The Rapid Growth in the Number of Devices Connected to the Internet**

## In transportation

- Self driving cars
- Interaction with non-self driving cars
- Connected infrastructure, roadways
- Improving driving experience by providing information  
e.g Safety, Mobility, Environment
- Vehicle tracking

## In Factories/Manufacturing

- IP enabled connectivity & reporting
- Data & control from Control room vs mobile access on factory floor
- RFID

## Convergence of IT and OT

### IT - Information Technology

IT supports connections to the Internet along with related data and technology systems and is focused on the secure flow of data across an organization.

### OT - Operation Technology

OT monitors and controls devices and processes on physical operational systems.



Initially, IT and OT had nothing to do with each other.

OT is beginning to adopt the network protocols, technology, transport, and methods of the IT organization, and the IT organization is beginning to support the operational requirements used by OT.

There are still issues to work out, such as what takes priority in the network and others.

## IoT Challenges

### IoT Challenges

 Challenge	 Description
<u>Scale</u>	Scale of IT networks can be large, the scale of OT can be bigger.
<u>Security.</u>	If a device gets hacked, its connectivity is a major concern. A compromised device can serve as a launching point to attack other devices and systems.
<u>Privacy</u>	Much of the data gathered will be specific to individuals and their activities. Businesses use this data (think of personalized ads)
<u>Big data and data analytics</u>	Large number of Sensors mean lots of data to be handled.
<u>Interoperability - the ability of computer systems or software to exchange and make use of information.</u>	Due to various protocols and architectures, some are not compatible with IoT standards