AMRITA VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY

Introduction to IoT

22AIE211 Introduction To Communication & IoT

Internet of Things

Internet of things

From Wikipedia, the free encyclopedia

The **Internet of things** (**IoT**) describes the network of physical objects—"things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet.[1][2][3][4]

Things have evolved due to the convergence of multiple technologies, real-time analytics, machine learning, commodity sensors, and embedded systems.[1] Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. IoT can also be used in healthcare systems.[5]

Things, People and Cloud Services get connected via Internet to enable new use cases and business models

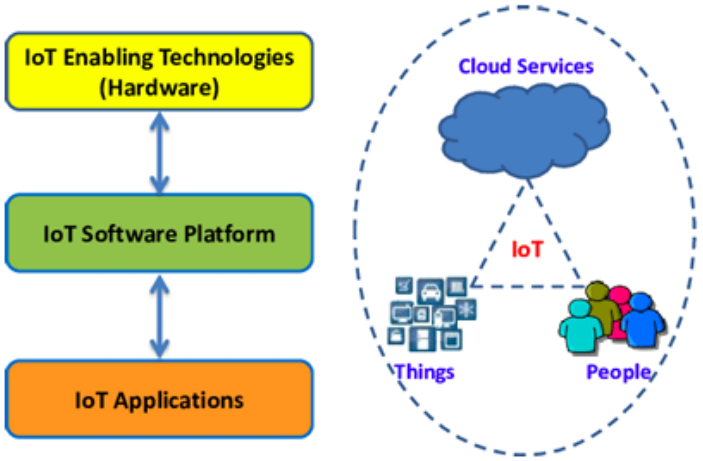
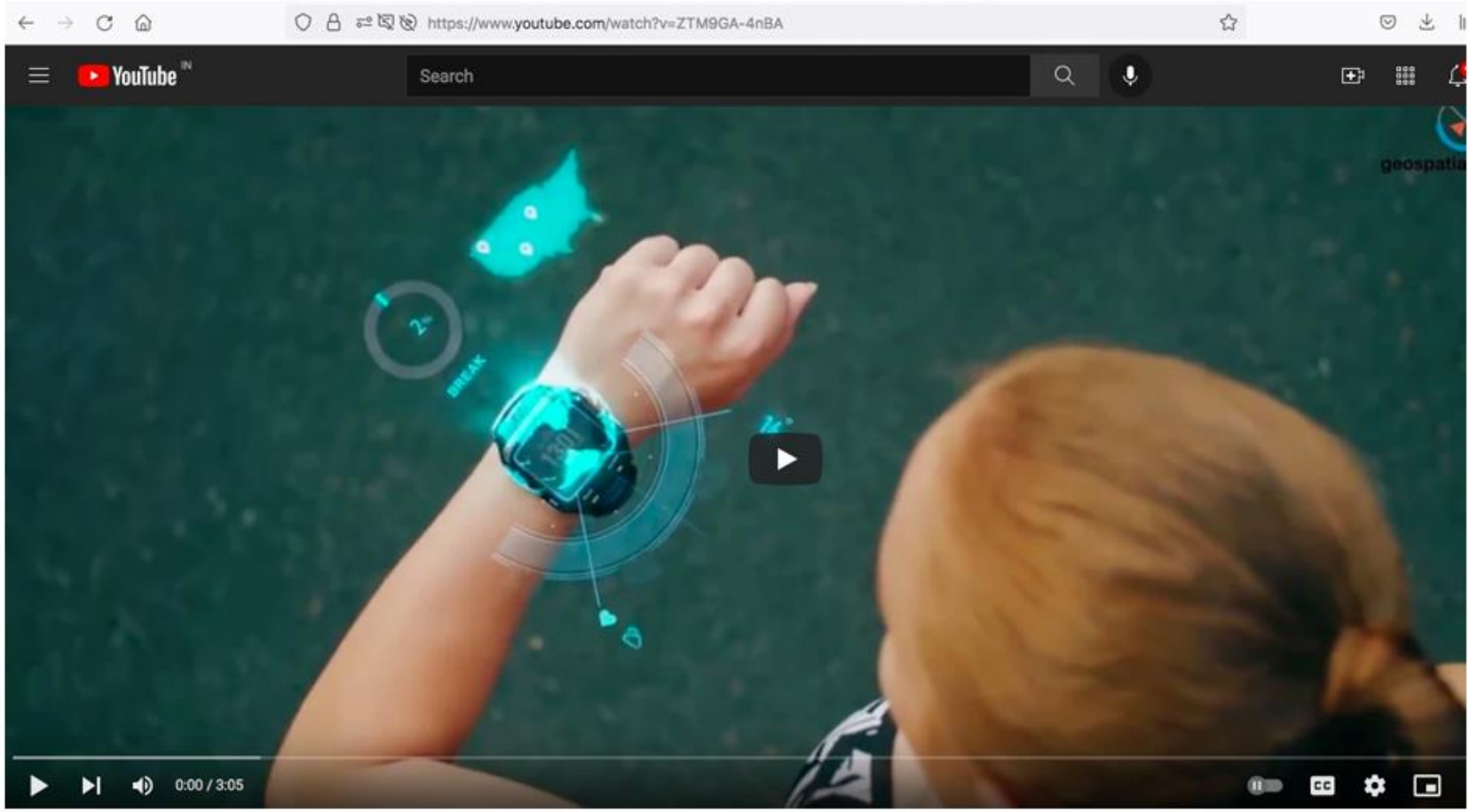


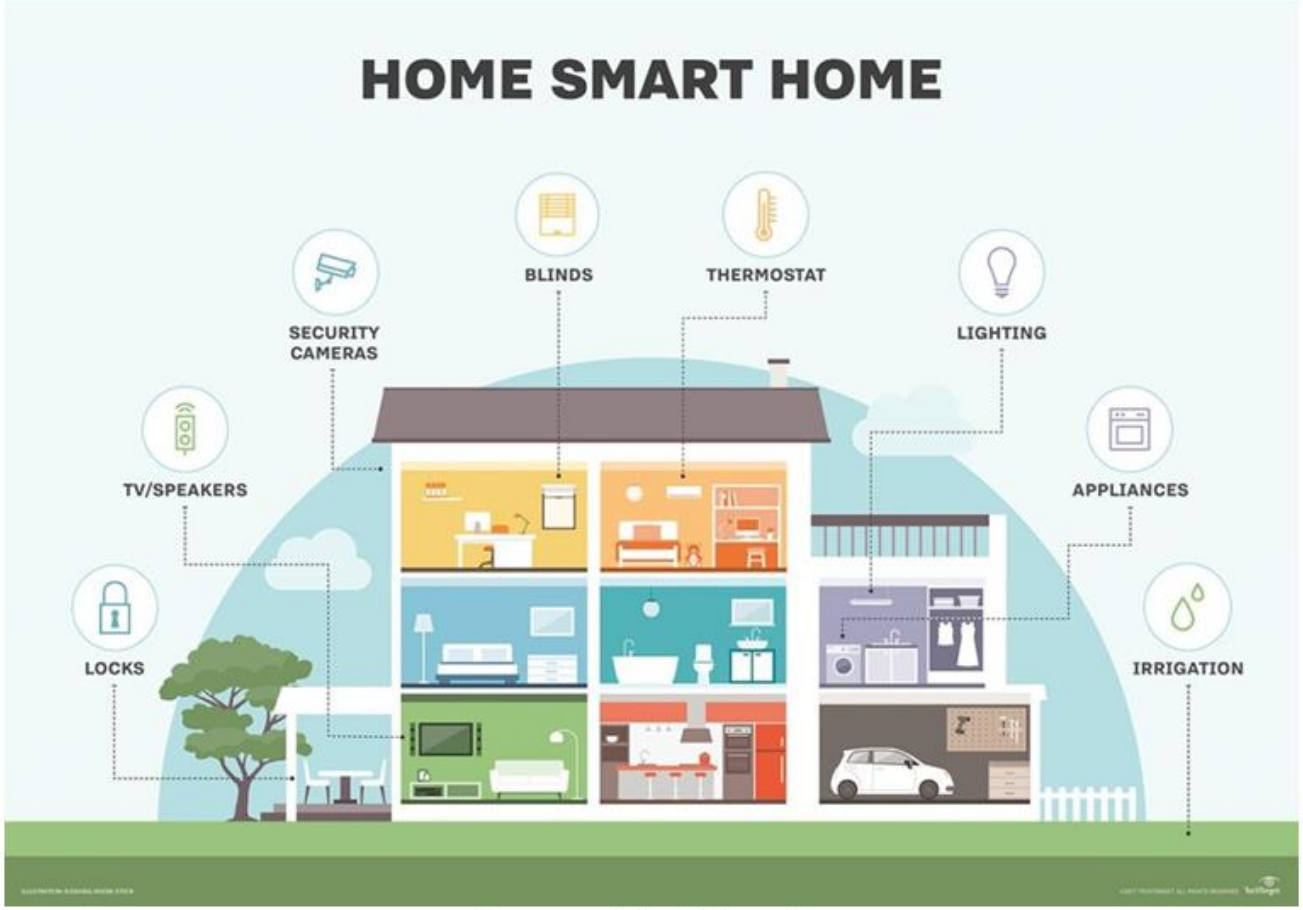
Figure source : Iman Khajenisiri et.al., A Review of Internet of Things Solution for Intelligent Energy Control in Buildings for Smart City Applications, Energy Procedia, Volume 111, 2017

Internet of Things : Applications

Watch this!!!

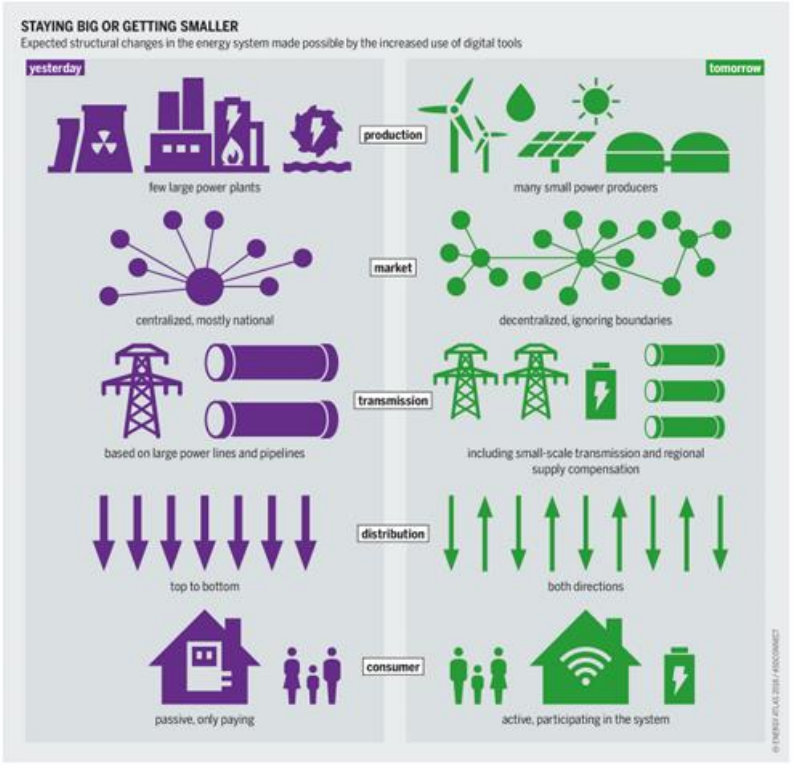


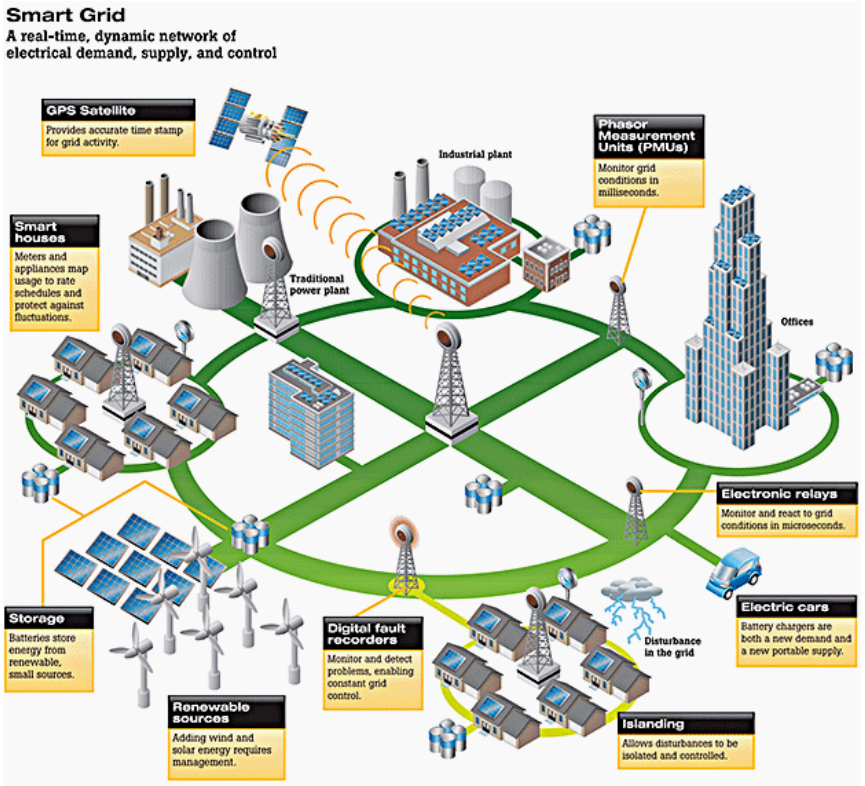
Internet of Things Applications



Source : TechTarget

Internet of Things Applications : Smart Grid





Source : Internet

Watch This : [Smart Grids in India by TU Delft!]

Internet of Things Applications : Healthcare

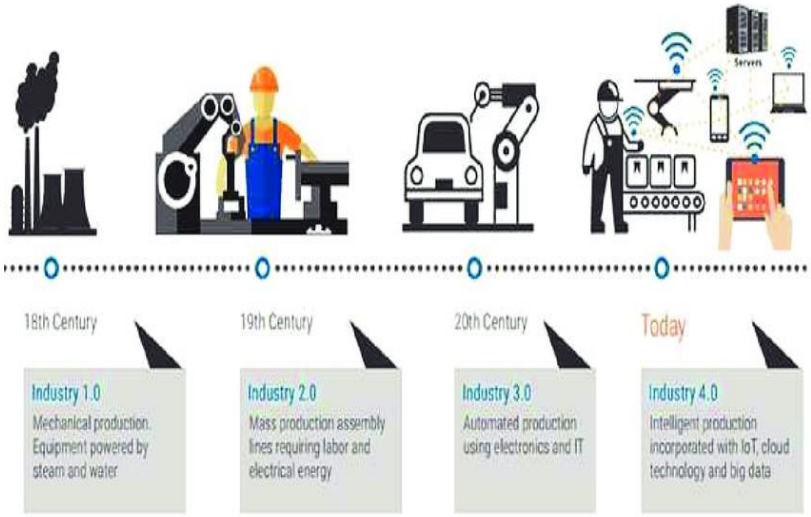
Role of IoT in Healthcare

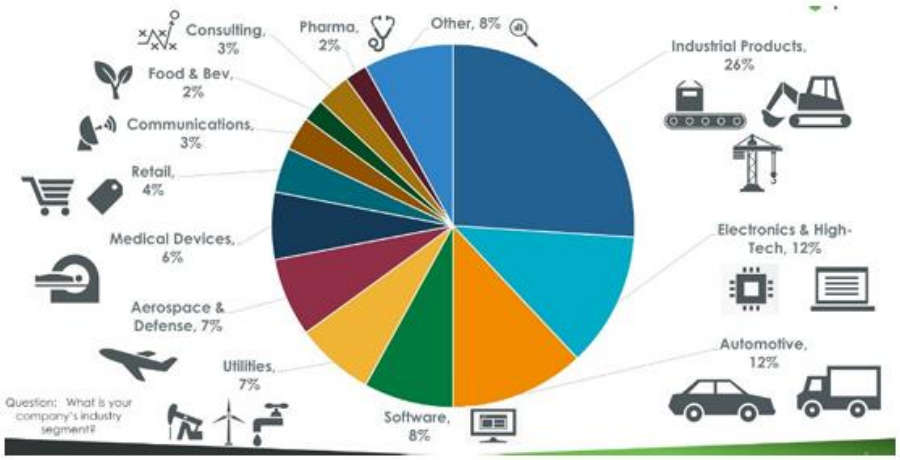
Source : Internet

Wearables

Source : Internet

Internet of Things Applications : Industry 4.0





Internet of Things Applications : Agriculture

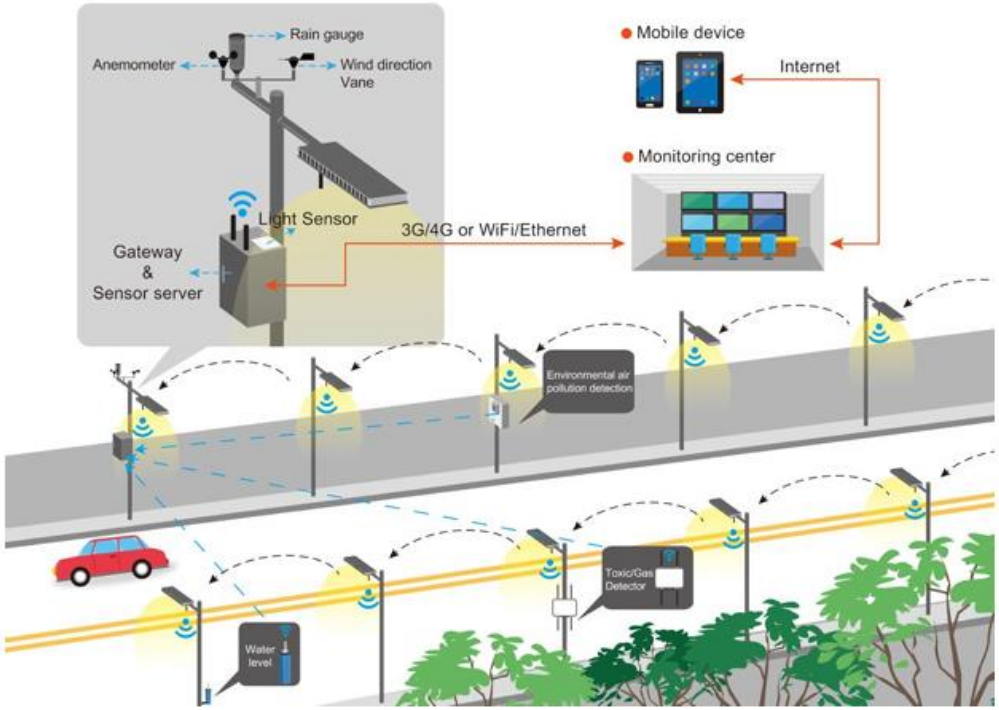
Source : Internet

Watch This : [Smart Agriculture Solution by Infosys]

Internet of Things Applications : Smart City

Source : Internet of Things is a revolutionary approach for future technology enhancement: a review, Sachin Kumar et al. , Journal of Big Data, Springer, 2019

Internet of Things Applications : Smart Street Lights



Source : Internet

History of Internet of Things

First IoT Device : RFID (1940-1950), Major efforts in development for Tracking and identifying aircrafts in World War II (Friends or Foe)

1960 : RFID was used for monitoring nuclear and other hazardous materials, RFID companies founded

1973 : Mario W. Cadullo received the first US Patent for an active RFID tag

1980 : RFID research started, marks the beginning of transforming RFID into more widespread technology

1990 : First UHF Reader invented, RFID usage expanded to shipments, Walmart introduces their RFID program

Source : Internet

History of Internet of Things

"Machine to Machine" (M2M)
(~1970s +)

Internet of Things Beginnings

Carnegie Mellon Internet
Coke Machine (1982, 1990)

Internet Toaster
(1990)

Trojan Room Coffee
Pot
(first webcam)
(1991)

Source : Introduction to the Internet of Things, Marco Zennaro, Telecommunications/ICT4D Lab, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

History of Internet of Things : Progression

Progression in 1980's : **Cloud and Server Space (Data moved to centralized server)**

Progression in 1990's : **Machine to Machine interaction**

1995 : First cellular module built, First GPS network (version 1) complete
1998 : IPv6 adds 2^128 new IP addresses
1999 : Kevin Ashton of MIT coins a new term IoT

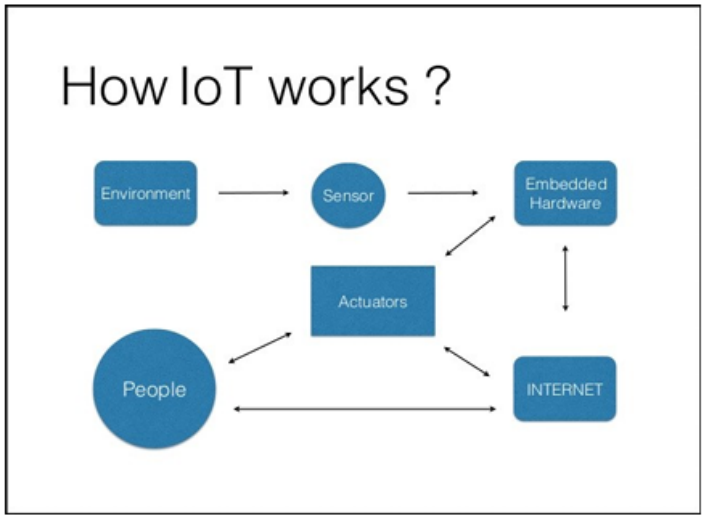
Progression in 2000-2010 : **Fog oriented architectures (Central Server to Regional Server located closer to Data Server subnetwork)**

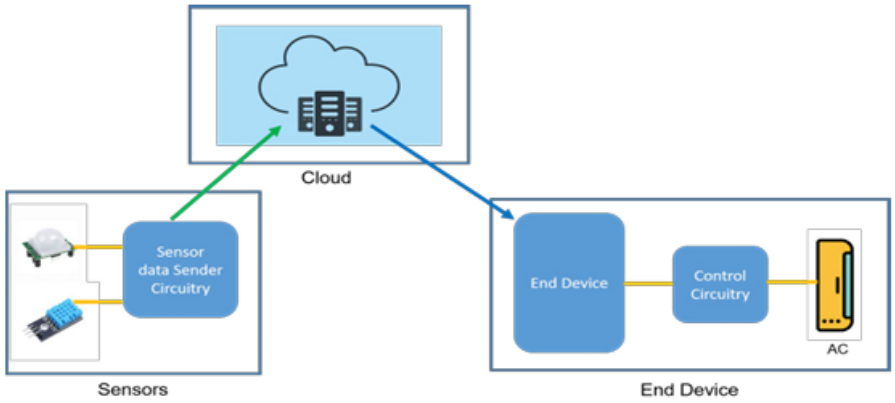
2000 : LG announces first smart fridge
2007 : First iPhone released
2008 : First International Conference on IoT held
2009 : Google started testing self driving cars

Progression in 2010-onwards : **High Processing power and Edge computing**

2013 : Google glass is released
2014 : Amazon releases Echo (smart home market opens)
2015 : GM, Uber, Tesla are testing self driving cars
2017- : IoT continues to grow,

IoT – Basic Idea





Summary

- IoT Applications
- History of IoT