
IOT DATA



TOPICS

What is Internet of Things?

How IoT Works?

Current Status & Future Prospect of IoT

Knowledge Management – From Data to Wisdom

The Future of IoT

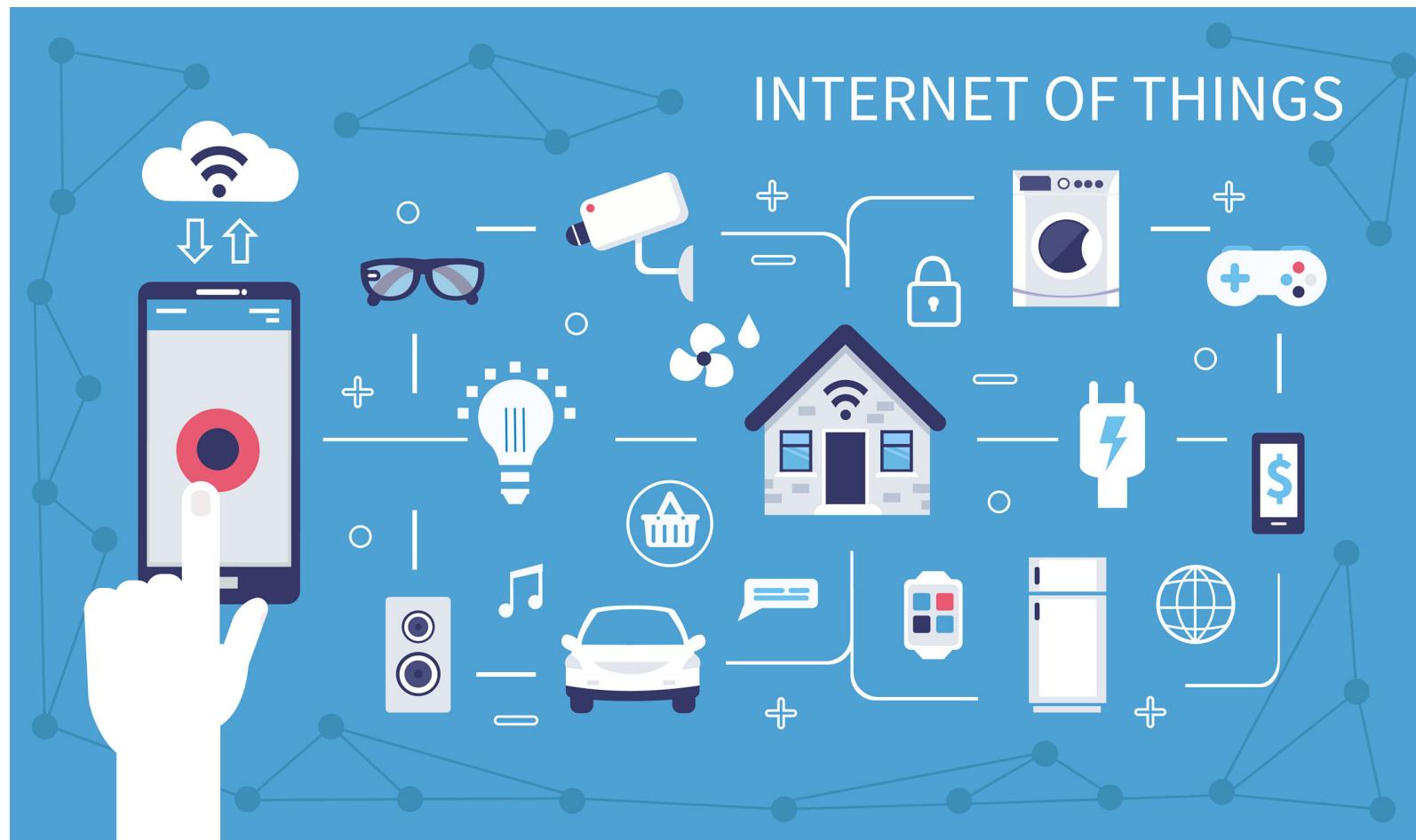
The Potential of IoT

Few Applications of IoT

Technological Challenges of IoT

Criticisms & Controversies of IoT

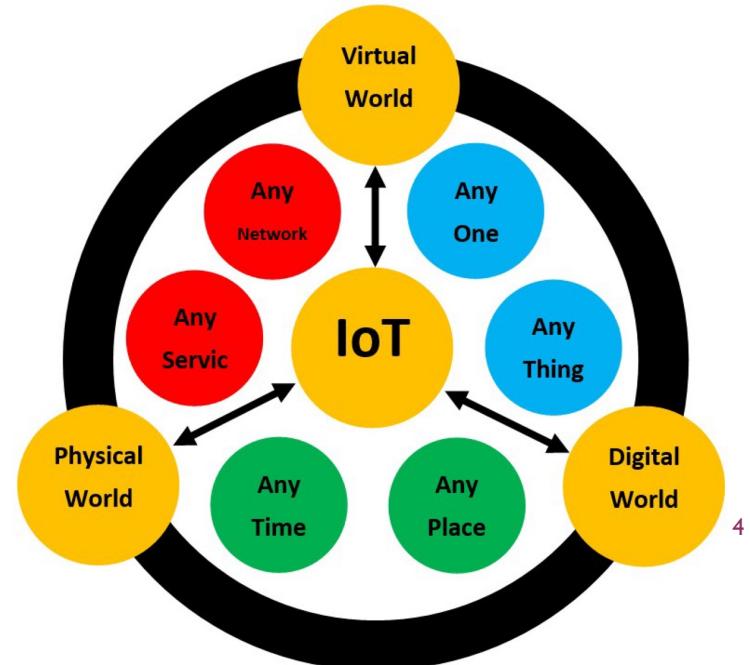
WHAT IS IOT



WHAT IS IOT

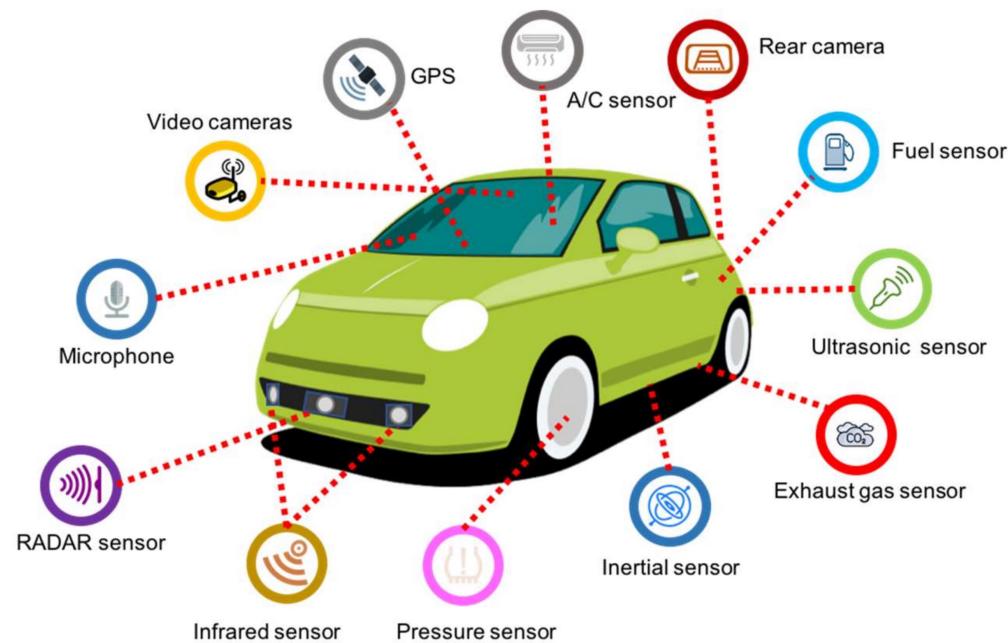
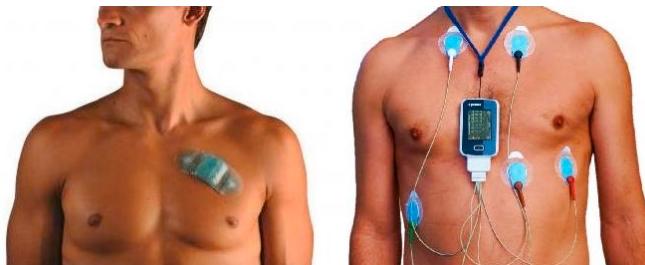
The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.

IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit.



WHAT IS IOT

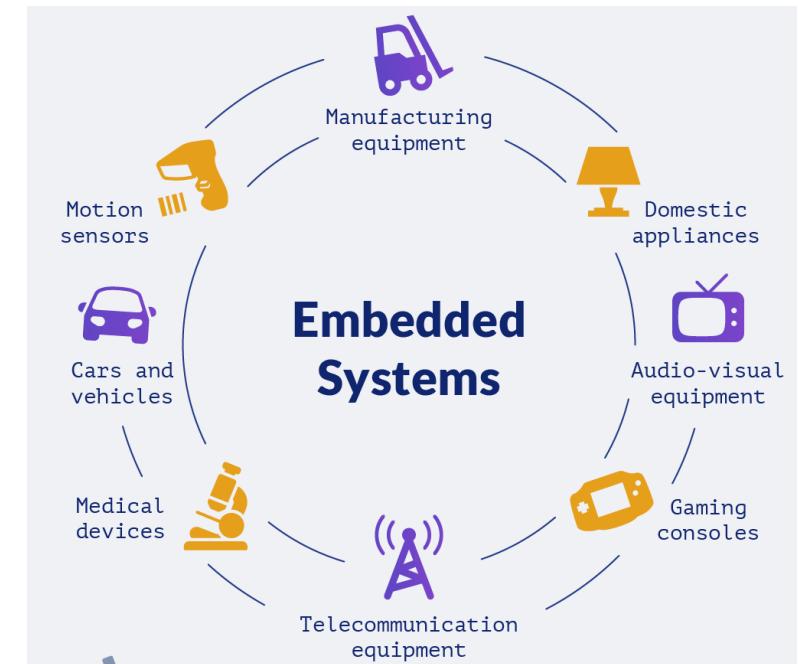
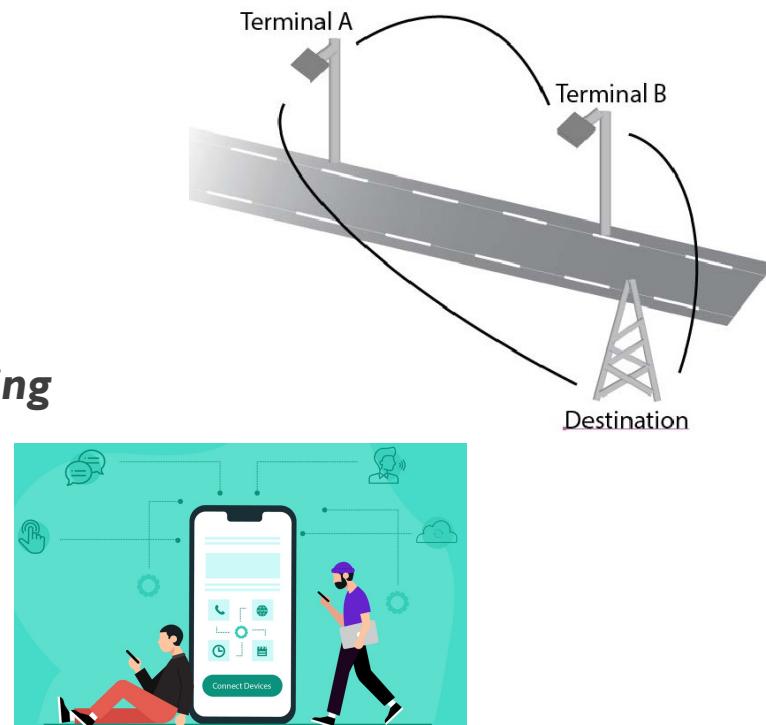
"**Things**," in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring or field operation devices that assist fire-fighters in search and rescue operations.



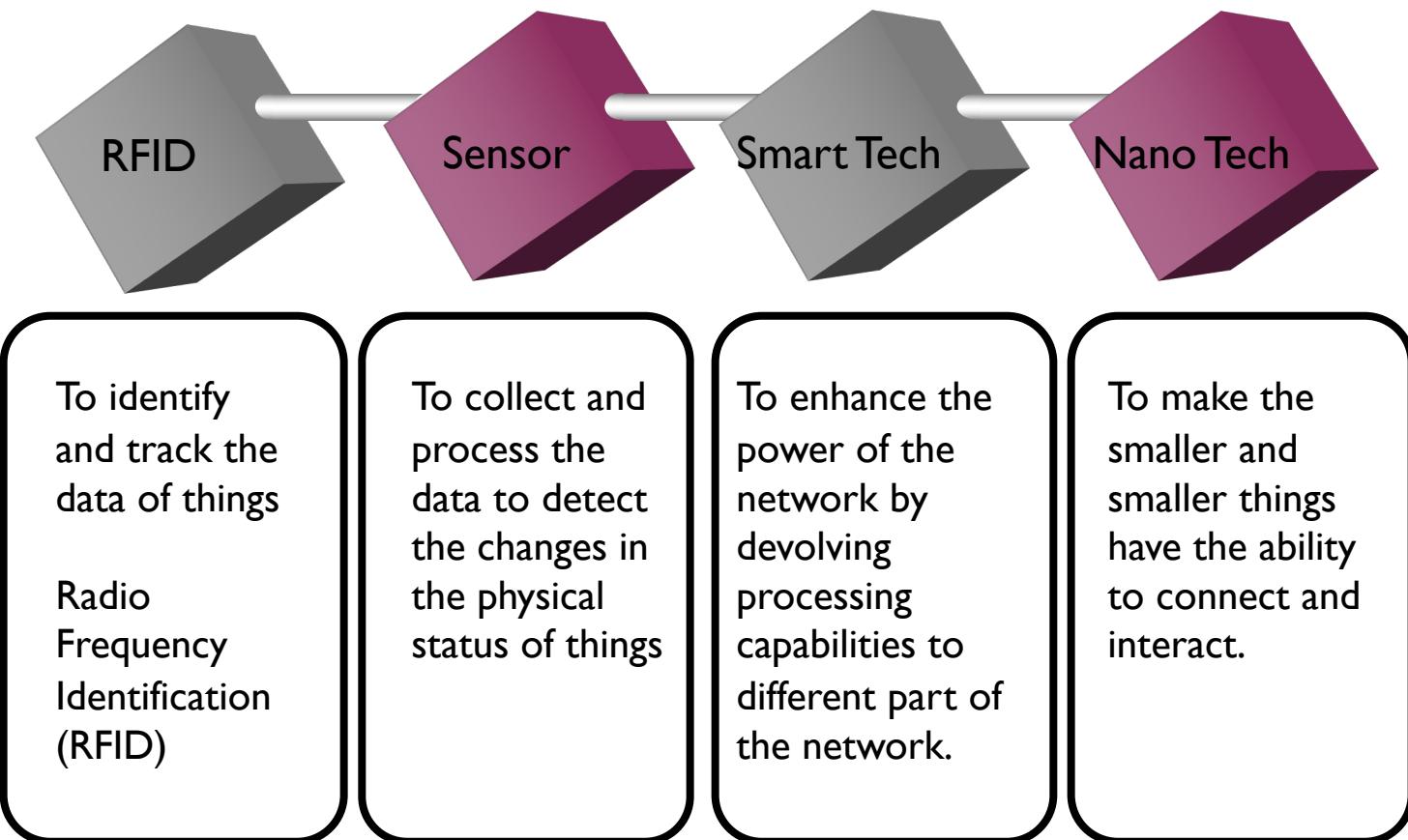
HOW IOT WORKS?

Internet of Things: bridge the gap between the virtual and physical world. These capabilities include:

- **Communication and cooperation**
- **Addressability**
- **Identification**
- **Sensing**
- **Actuation**
- **Embedded information processing**
- **Localization**
- **User interfaces**



HOW IOT WORKS?



STRUCTURE OF IOT

The IoT can be viewed as a gigantic network consisting of networks of devices and computers connected through a series of intermediate technologies.

➤ *Tagging Things :*

- Real-time item traceability and addressability by **RFIDs**.

➤ *Feeling Things :*

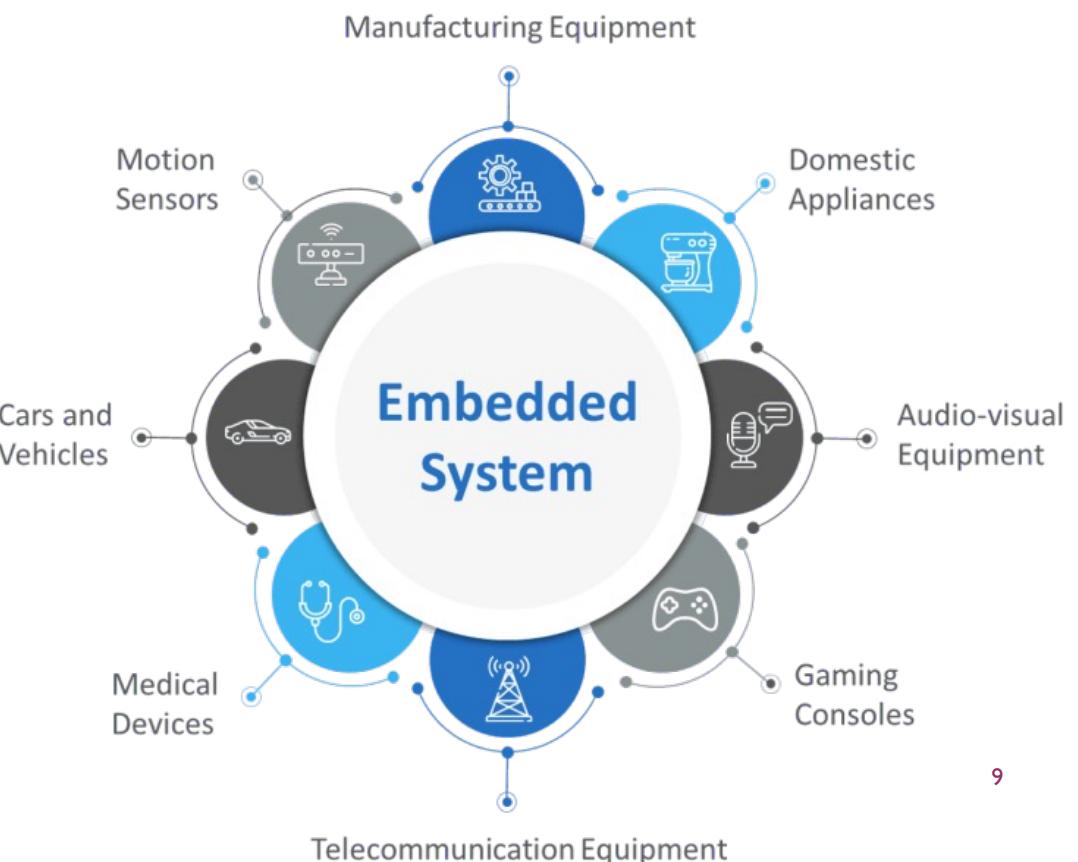
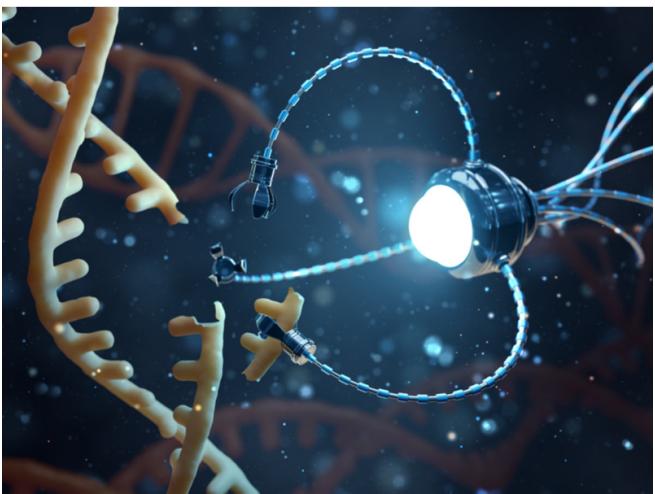
- **Sensors** act as primary devices to collect data from the environment.



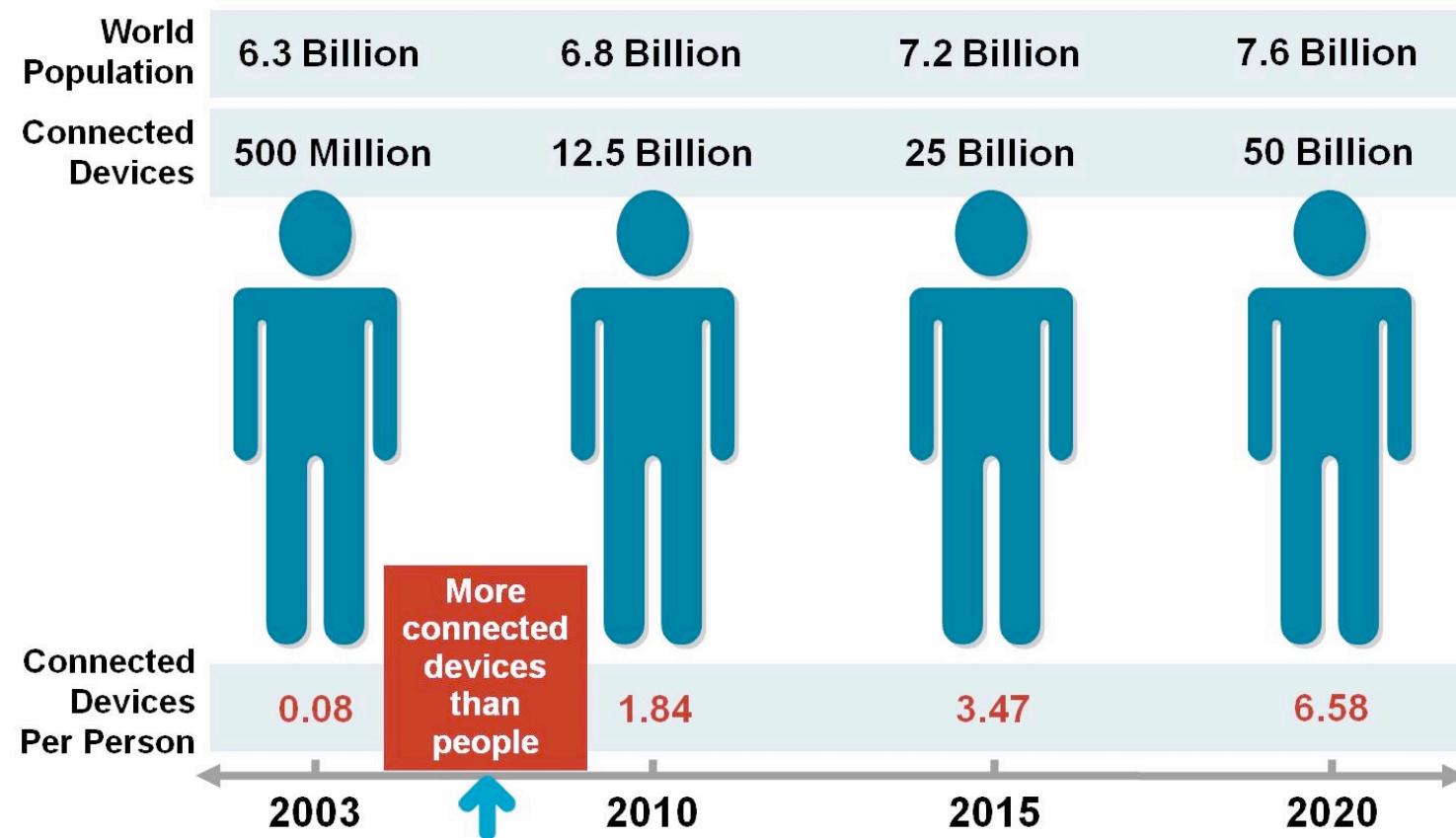
STRUCTURE OF IOT

The IoT can be viewed as a gigantic network consisting of networks of devices and computers connected through a series of intermediate technologies.

- **Shrinking Things :**
- Miniaturization and **Nanotechnology** has provoked the ability of smaller things to interact and connect within the “things” or “smart devices.”
- **Thinking Things :**
- **Embedded intelligence** in devices through sensors has formed the network connection to the Internet. It can make the “things” realizing the intelligent control.

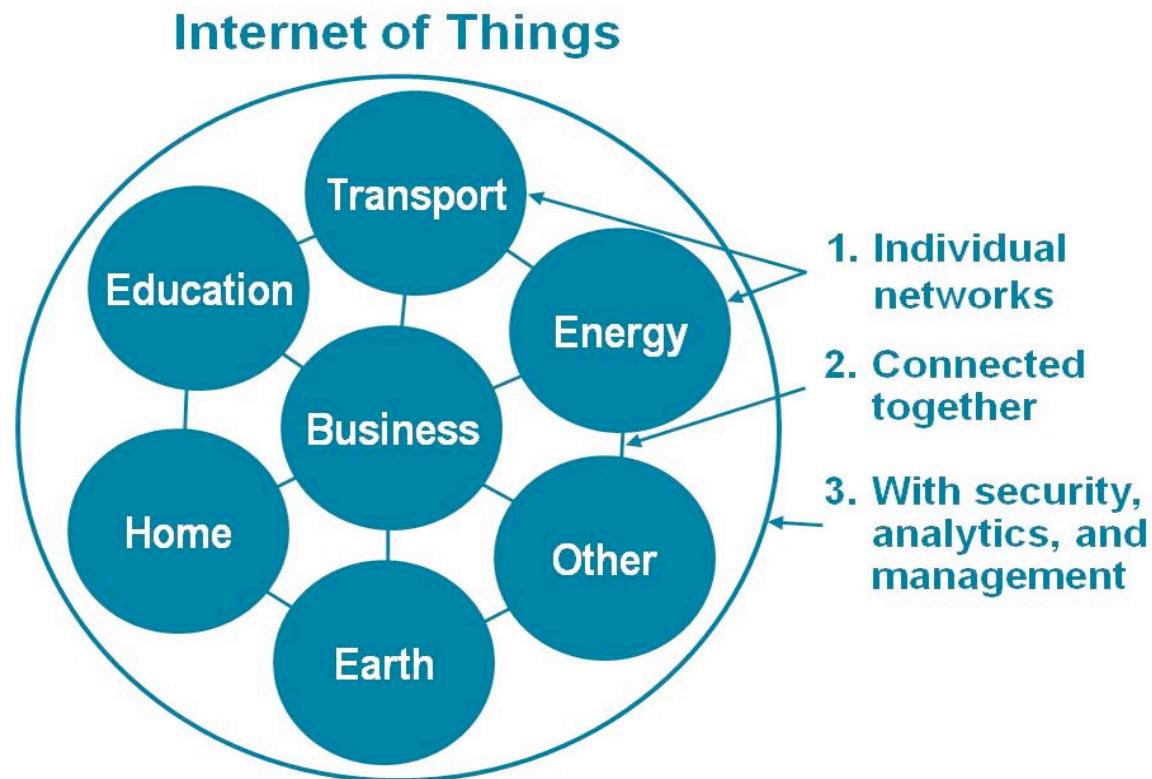


FUTURE OF IOT



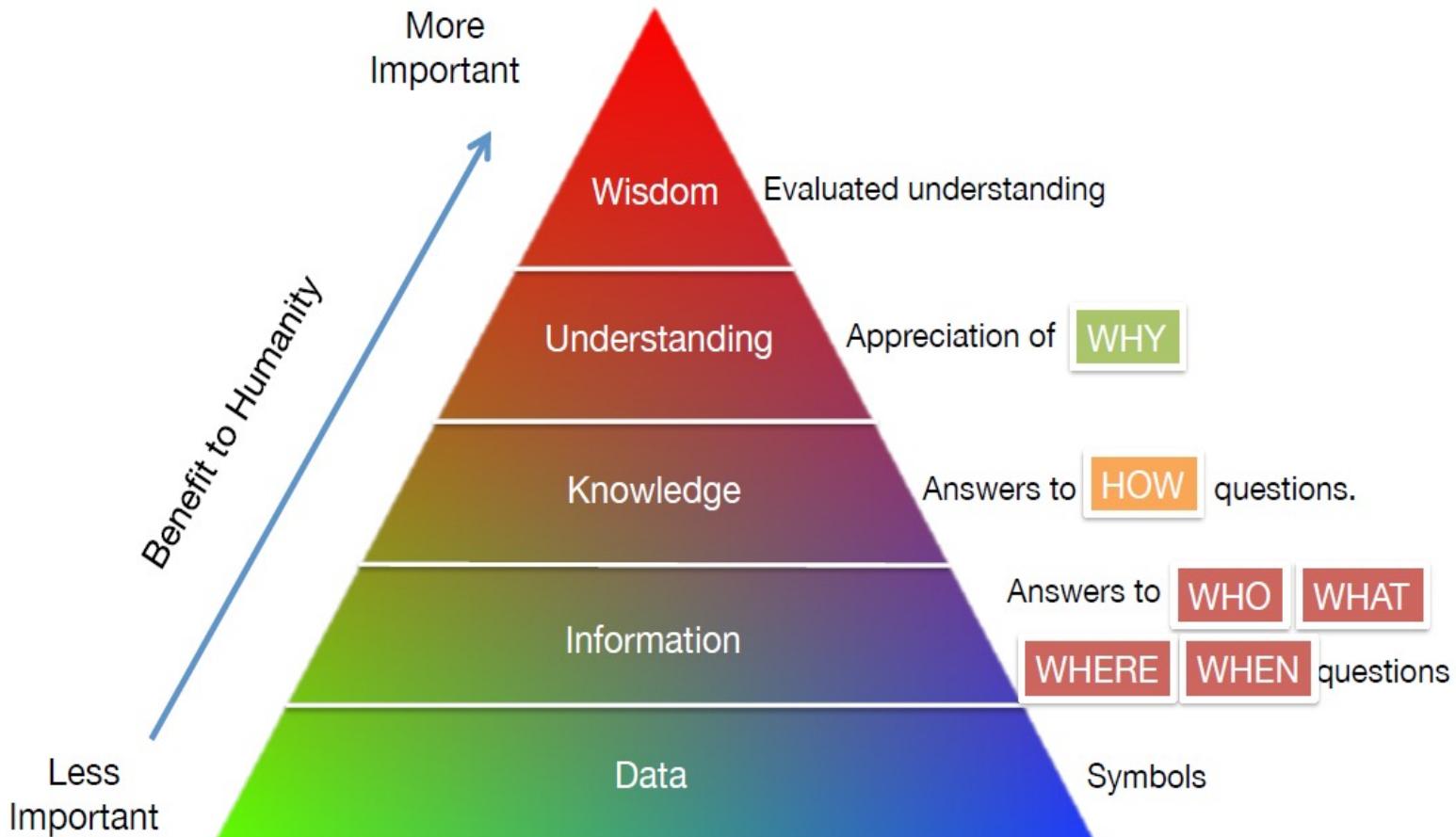
"Change is the only thing permanent in this world"

IOT AS A NETWORK OF NETWORKS:



These networks connected with added security, analytics, and management capabilities. This will allow IoT to become even more powerful in what it can help people achieve.

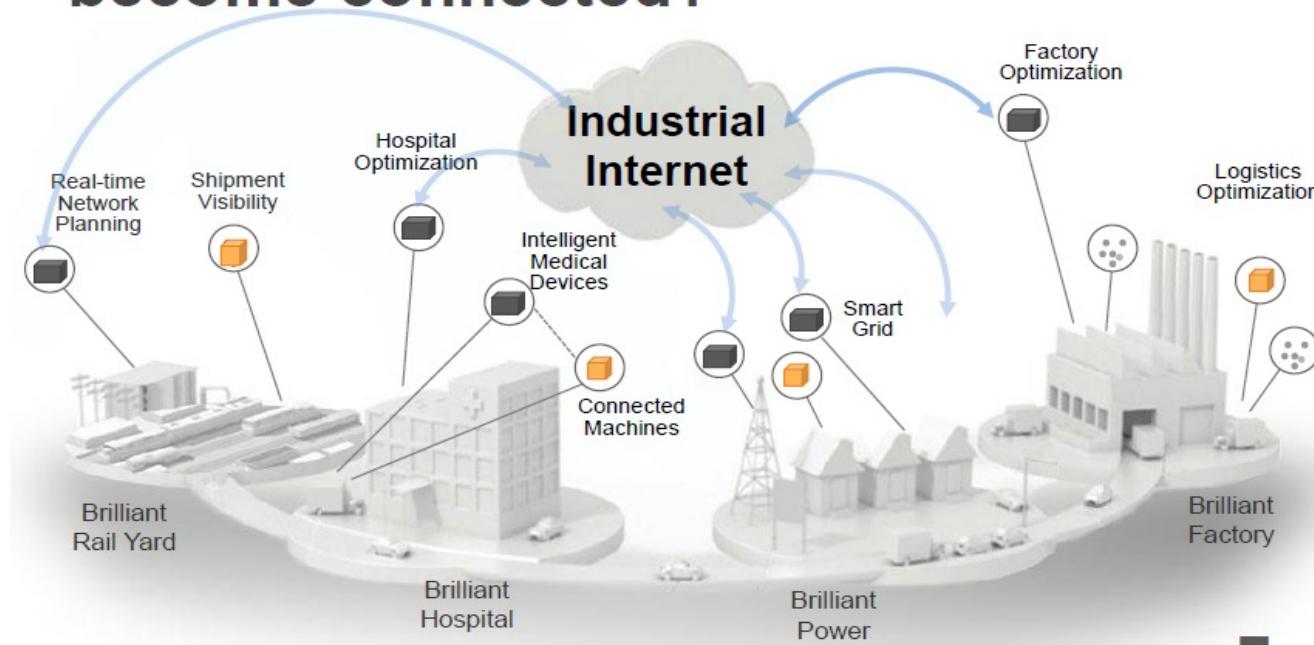
KNOWLEDGE MANAGEMENT – TURNING DATA INTO WISDOM



The more data that is created, the better understanding and wisdom people can obtain.

FUTURE OF IOT

What happens when **50B Machines** become connected?



[OT is virtualized Analytics become predictive Employees increase productivity]

[Machines are self healing & automated Monitoring and maintenance is mobilized]



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"The Sky's not the limit. It's only the beginning with IoT."

THE POTENTIAL OF IOT

Value of Industrial Internet is huge

Connected machines and data could eliminate up to \$150 billion in waste across industries

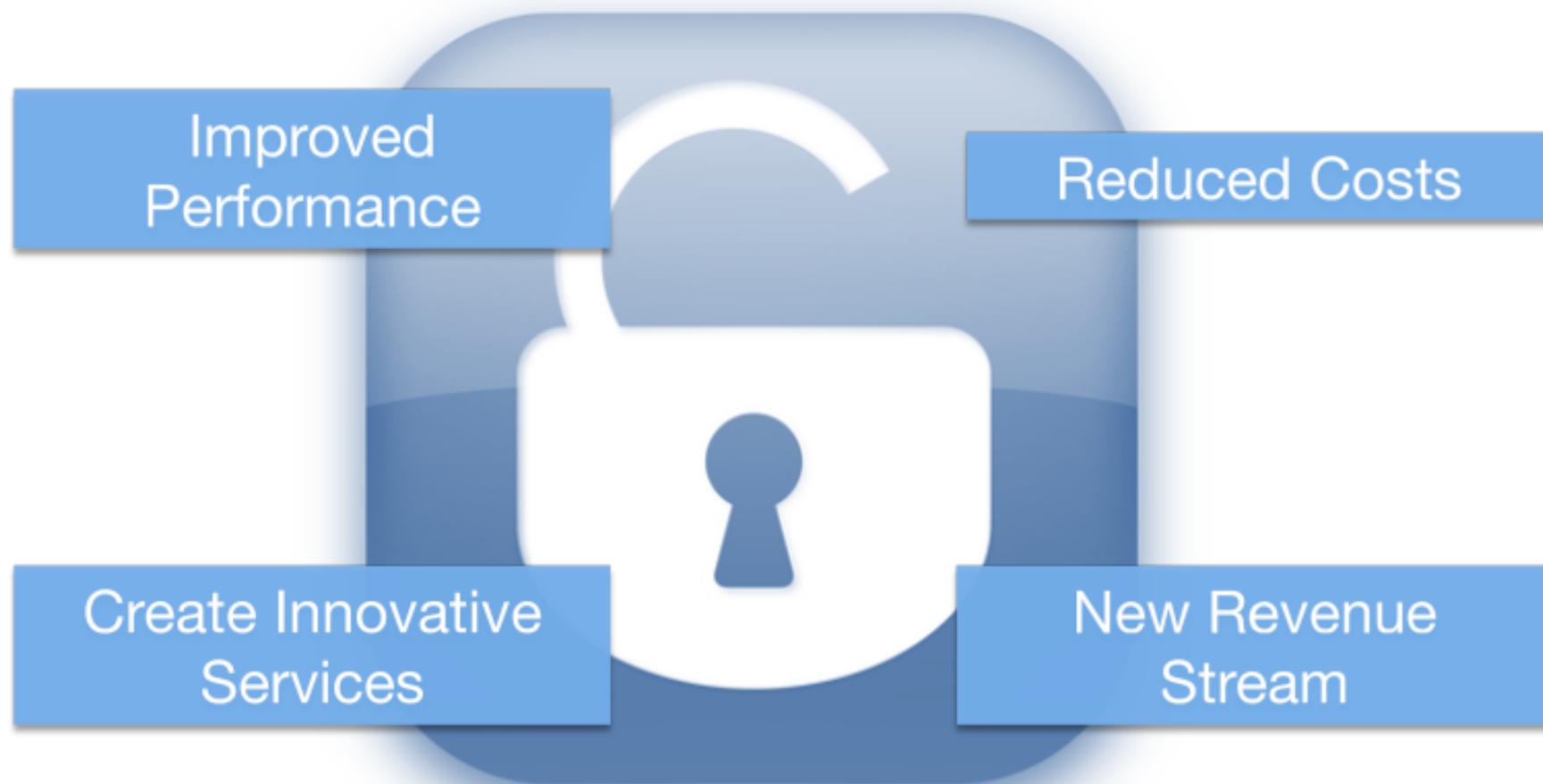
Industry	Segment	Type of savings	Estimated value over 15 years (Billion nominal US dollars)
 Aviation	Commercial	1% fuel savings	\$30B
 Power	Gas-fired generation	1% fuel savings	\$66B
 Healthcare	System-wide	1% reduction in system inefficiency	\$63B
 Rail	Freight	1% reduction in system inefficiency	\$27B
 Oil and Gas	Exploration and development	1% reduction in capital expenditures	\$90B

Note: Illustrative examples based on potential one percent savings applied across specific global industry sectors. Source: GE estimates

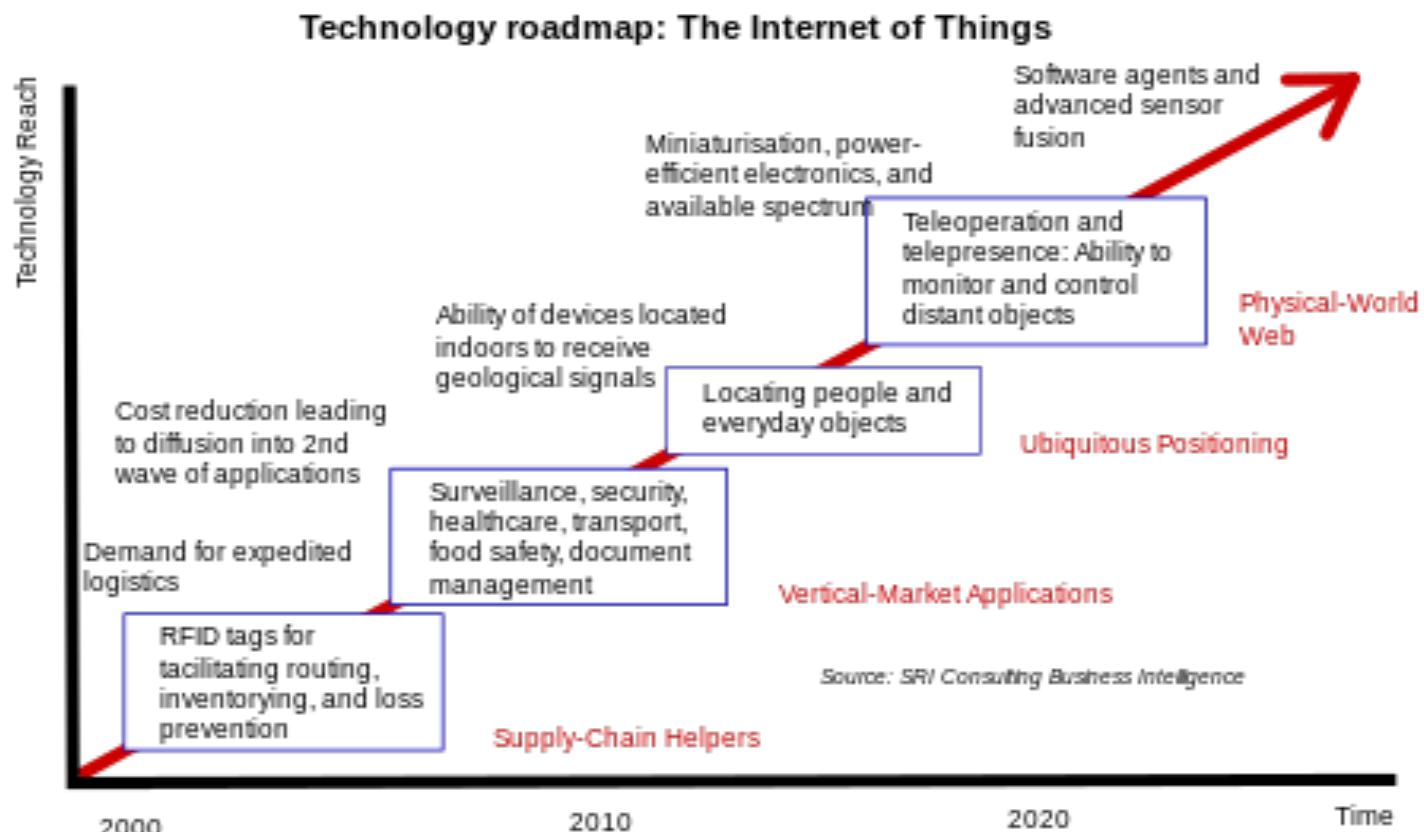
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GE's estimates on potential of just ONE percent savings applied using IoT across global industry sectors.

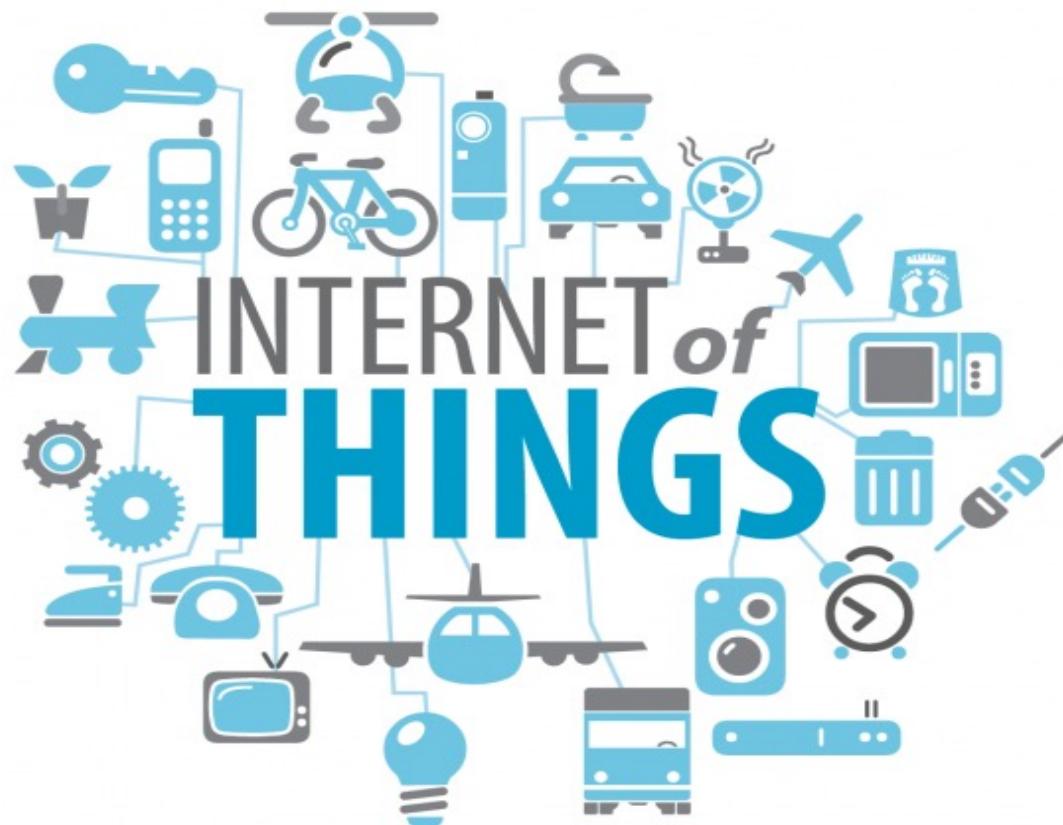
POTENTIAL OF IOT



TECHNOLOGY ROADMAP OF IOT



APPLICATIONS OF IOT



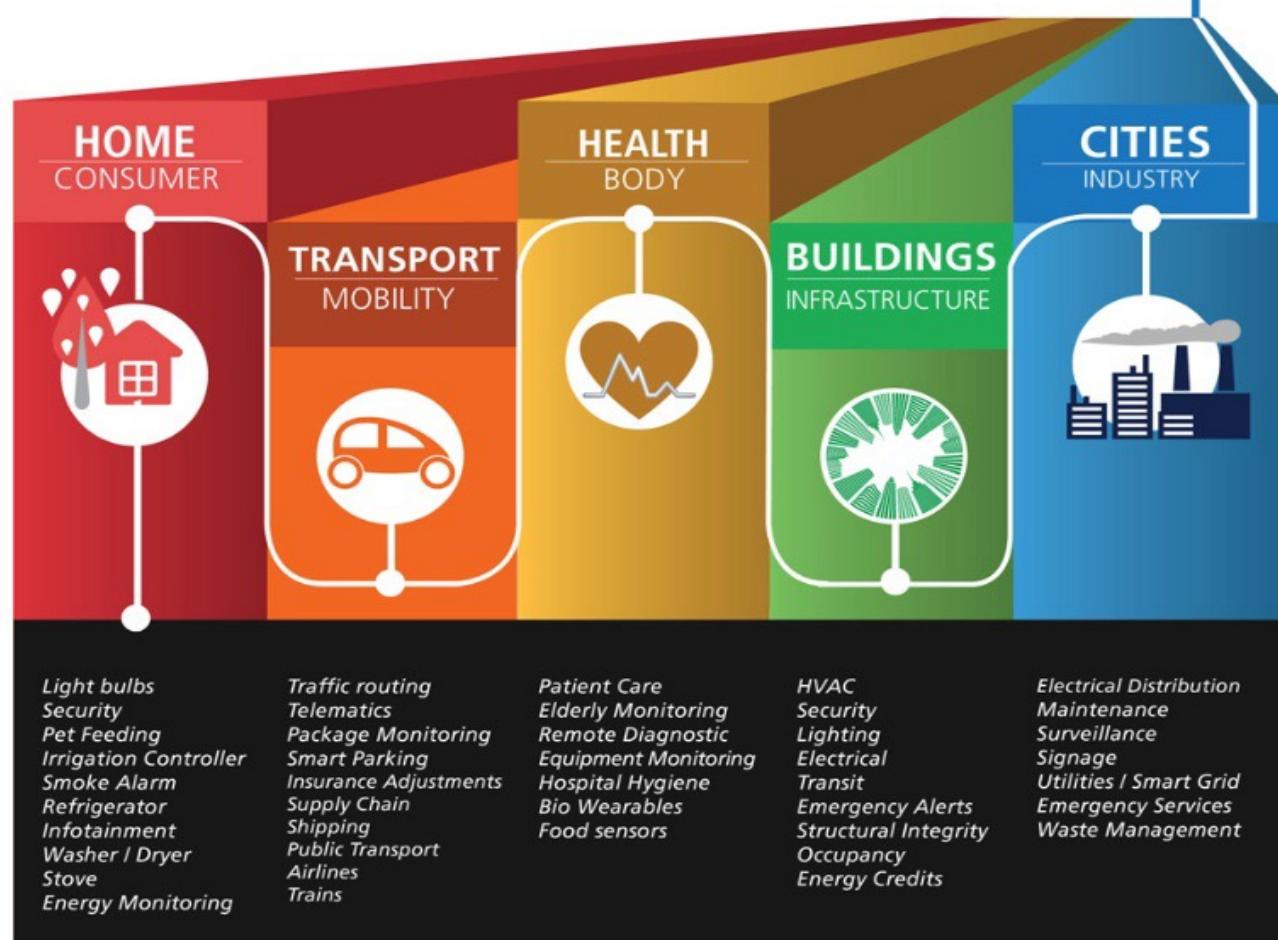
"The Ultimate Goal of IOT is to Automate Human Life."

APPLICATIONS OF IOT

- ✓ Building and Home automation
- ✓ Manufacturing
- ✓ Medical and Healthcare systems
- ✓ Media
- ✓ Environmental monitoring
- ✓ Infrastructure management
- ✓ Energy management
- ✓ Transportation
- ✓ Better quality of life for elderly
- ✓

APPLICATIONS OF IOT

TO ➔ DIVERSE APPLICATIONS



APPLICATIONS OF IOT

Smart Parking

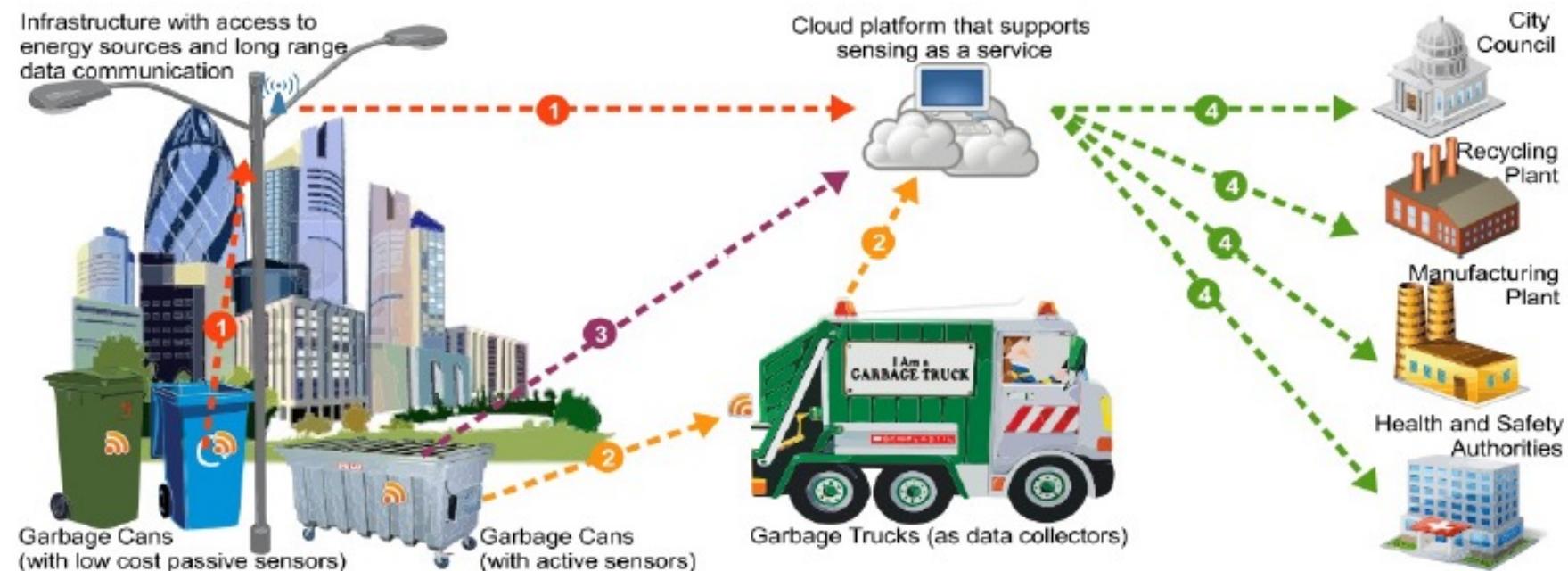
Create **USD 41Billion** by providing visibility into the availability of parking spaces across the city.



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

APPLICATIONS OF IOT

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



APPLICATIONS OF IOT



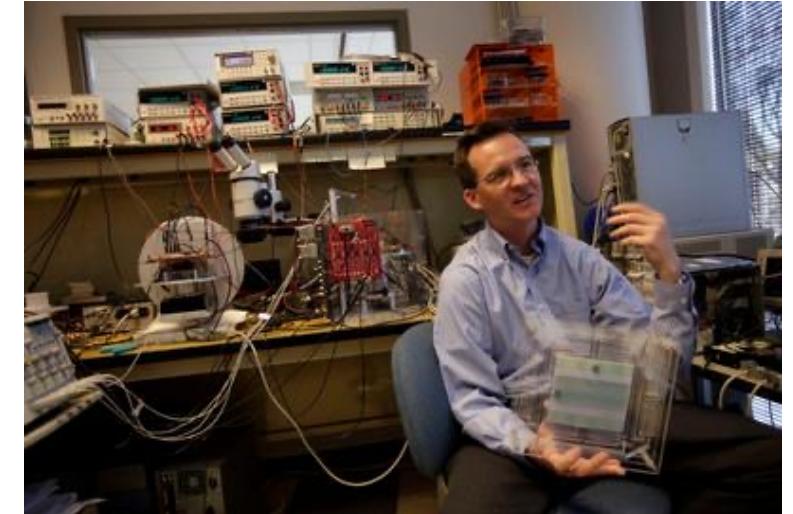
In the world of IoT, even the cows will be connected and monitored. Sensors are implanted in the ears of cattle. This allows farmers to monitor cows' health and track their movements, ensuring a healthier, more plentiful supply of milk and meat for people to consume. On average, each cow generates about 200 MB of information per year.²²

APPLICATIONS OF IOT

Initiatives and advances,

- Cisco's Planetary Skin,
- GE's Industrial Internet,
- HP's central nervous system for the earth (CeNSE),
- smart dust,
- Bell's lab

have the potential to add millions—even billions—of sensors to the Internet.



As cows, water pipes, people, and even shoes, trees, and animals become connected to IoT, the world has the potential to become a better place.

“With a trillion sensors embedded in the environment—all connected by computing systems, software, and services—it will be possible to hear the heartbeat of the Earth, impacting human interaction with the globe as profoundly as the Internet has revolutionized communication.” - Peter Hartwell, Senior Researcher, HP Labs.

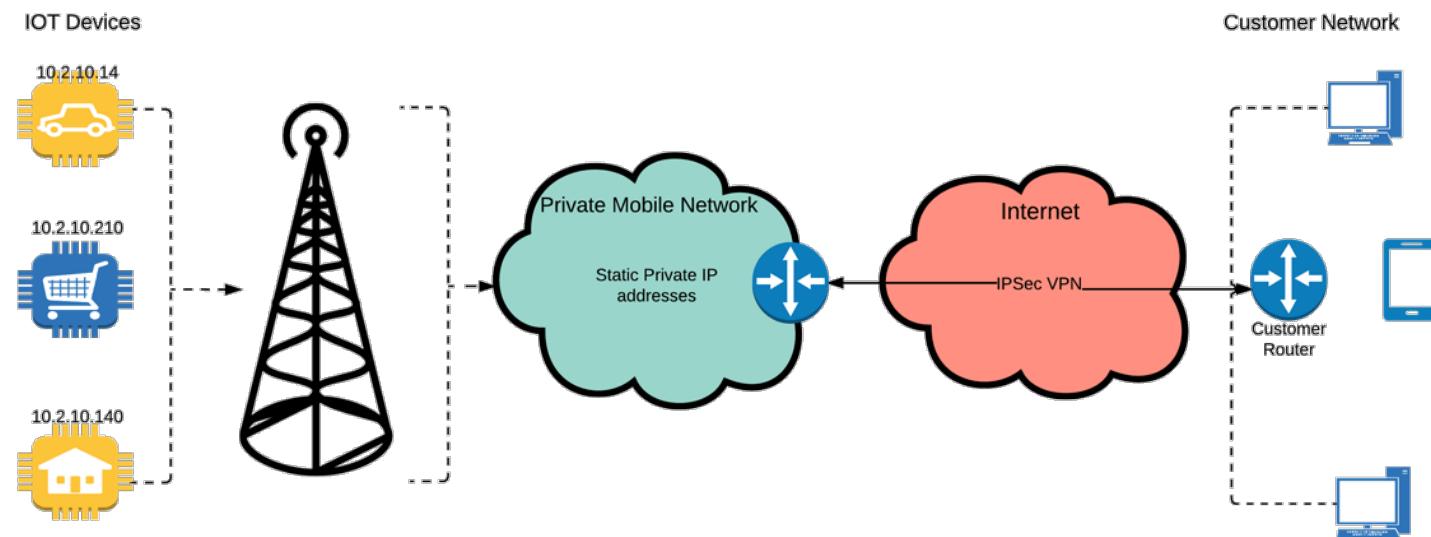
“How much more IoT can do is only left to your imagination”

APPLICATIONS OF IOT

Internet of Things is the next stage of the information revolution and referenced the inter-connectivity of everything from urban transport to medical devices to household appliances.

Integration with the Internet implies that devices will use an IP address as a unique identifier. However, due to the limited address space of IPv4 (which allows for 4.3 billion unique addresses), objects in the IoT will have to use IPv6 to accommodate the extremely large address space required.

Objects in the IoT will not only be devices with sensory capabilities, but also provide actuation capabilities (e.g., bulbs or locks controlled over the Internet).



APPLICATIONS OF IOT

On the other hand, IoT systems could also be responsible for performing actions, not just sensing things. Intelligent shopping systems, for example, could monitor specific users' purchasing habits in a store by tracking their specific mobile phones. These users could then be provided with special offers on their favourite products, or even location of items that they need, which their fridge has automatically conveyed to the phone.

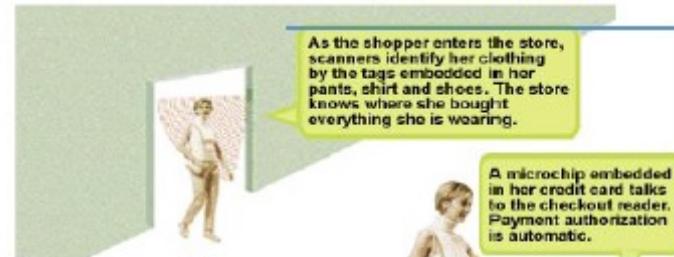
Additional examples of sensing and actuating are reflected in applications that deal with heat, electricity and energy management, as well as cruise-assisting transportation systems. Other applications that the Internet of Things can provide is enabling extended home security features and home automation.



IOT Application Scenario - Shopping



(2) When shopping in the market, the goods will introduce themselves.



(1) When entering the doors, scanners will identify the tags on her clothing.



(4) When paying for the goods, the microchip of the credit card will communicate with checkout reader.

(3) When moving the goods, the reader will tell the staff to put a new one.



HOW MANY STEPS
HAVE YOU
WALKED TODAY?

How Well Do I Sleep?

Sleep



YOUR SLEEP
EFFICIENCY
92%

Your sleep pattern

asleep

awake



You went to
bed at
11:00PM

Time to fall
asleep
0min

Times
awakened
20

You were in
bed for
6hrs 40min

Actual sleep
time
6hrs 6min

8 h 50 mins asleep

- Awake for 212 mins (81x)
- Restless for 278 mins (91x)

1d 1w 1m 3m 1y



Thursday, February 27

Sleep Stats

Time asleep over the past 30 days in hours



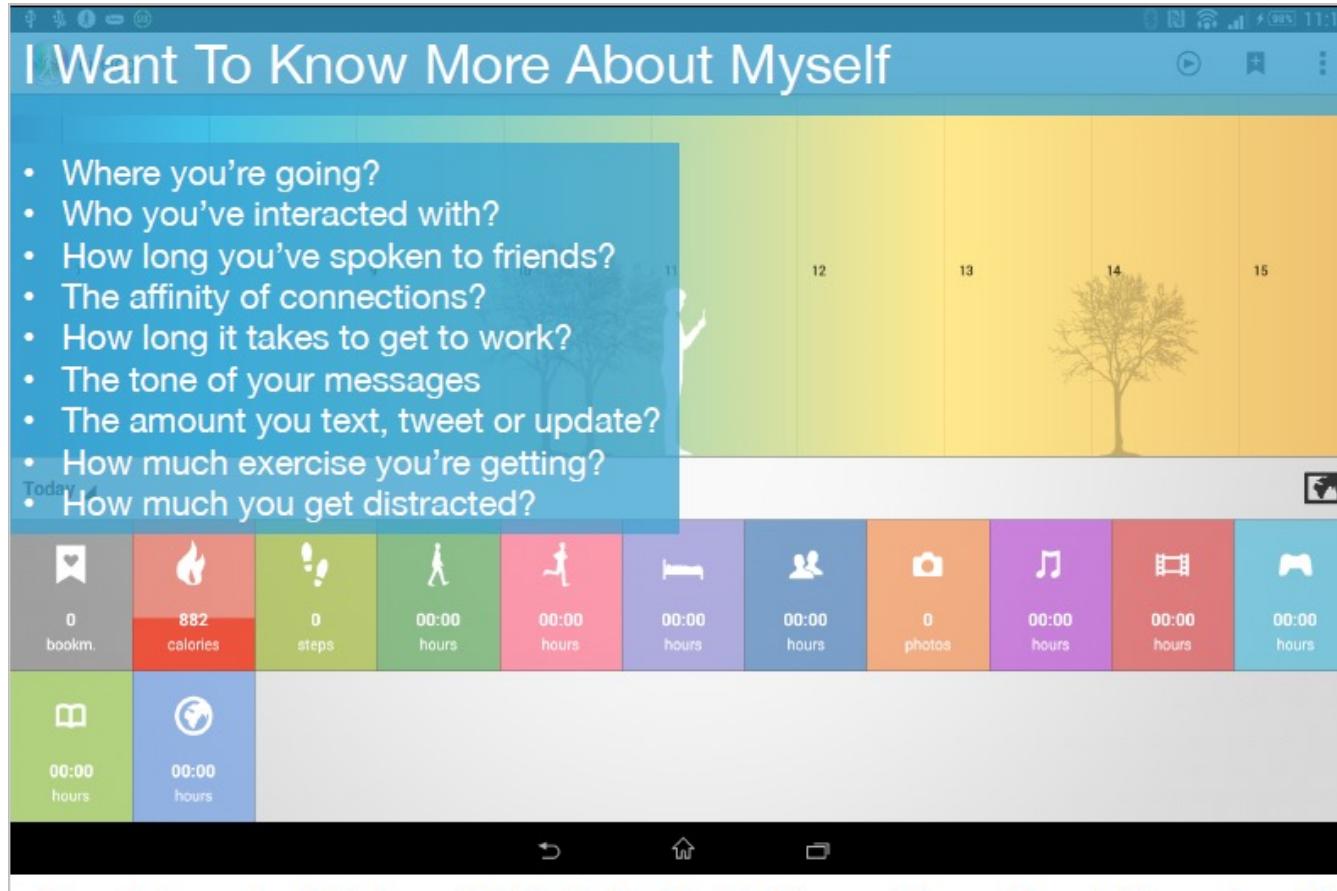
Times awoken over the past 30 days



fitbit flex

Wireless Activity + Sleep Wristband





Can Internet of Things (IOT) Help Us To Know More About Ourselves?

IoT helps you in LIFE LOGGING

Thought Controlled Computing



The flagship product, MindWave, is a headset that can log into your computer using just your thoughts. Researchers recently used the EEG headset to develop a toy car that can be driven forward with thought.

NeuroSky's smart sensors can also track your heart rate and other bodily metrics and can be embedded in the next generation of wearable devices.

"We make it possible for millions of consumers to capture and quantify critical health and wellness data," Yang (CEO of Softbank) said. Softbank is the funder.

TECHNOLOGICAL CHALLENGES OF IOT

At present IoT is faced with many challenges, such as:

- Scalability
- Technological Standardization
- Inter operability
- Discovery
- Software complexity
- Data volumes and interpretation
- Power Supply
- Interaction and short range communication
- Wireless communication
- Fault tolerance

“Big Data is not magic. It doesn’t matter how much data you have if you can’t make sense of it.”



CRITICISMS AND CONTROVERSIES OF IOT

Scholars and social observers and pessimists have doubts about the promises of the ubiquitous computing revolution, in the areas as:

- Privacy
- Security
- Autonomy and Control
- Social control
- Political manipulation
- Design
- Environmental impact
- Influences human moral decision making

SUMMARY

Internet of Things
Only Tip of an Iceberg

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5. Dr. Mazlan Abbas, MIMOS Berhad, Wisma IEM, Petaling Jaya