



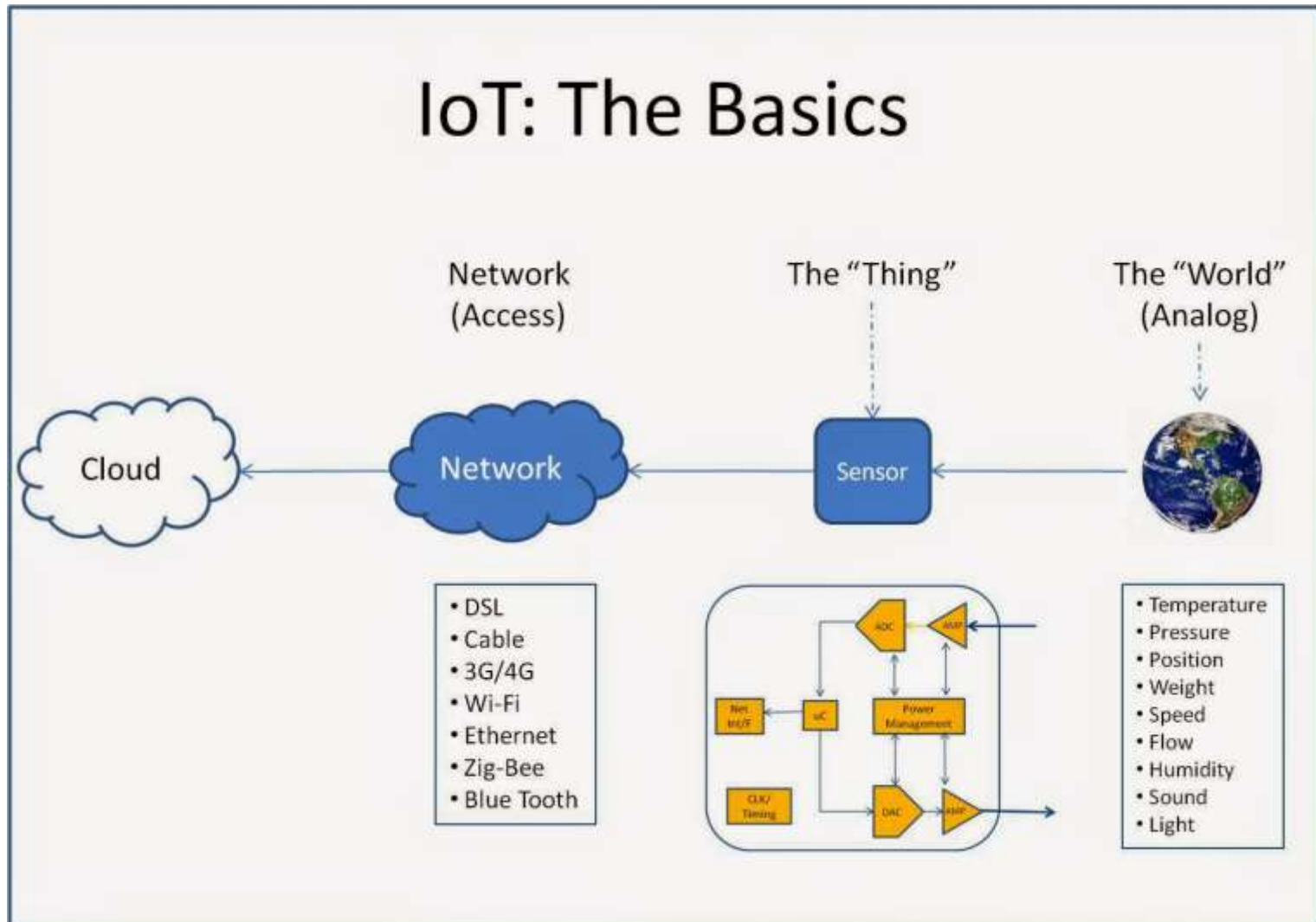
Happy Cuder, Happy Coding for a better life!

Recent Machine Learning Applications to Internet of Things (IoT)

Ha Noi, Nov 2016



- ▶ **Basic on Internet of Things**
- ▶ **Introduction to Machine Learning (ML)**
- ▶ **ML Application to Internet of Things**
 - ▶ **Application for research**
 - ▶ **Application in industry**
- ▶ **Internet of Things trend**
- ▶ **Required Skill**
- ▶ **3S Welcome**





- ▶ **The Internet of things (Internet of Things or IoT) is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data**



Introduction to Machine Learning (ML)

- ▶ **Machine learning is the subfield of computer science that "gives computers the ability to learn without being explicitly programmed".**



Machine Learning Applications to Internet of Things (IoT)

- ▶ **Recent Machine Learning Applications to Internet of Things (IoT)**
 - ▶ **Application for research**
 - ▶ **Application in industry**



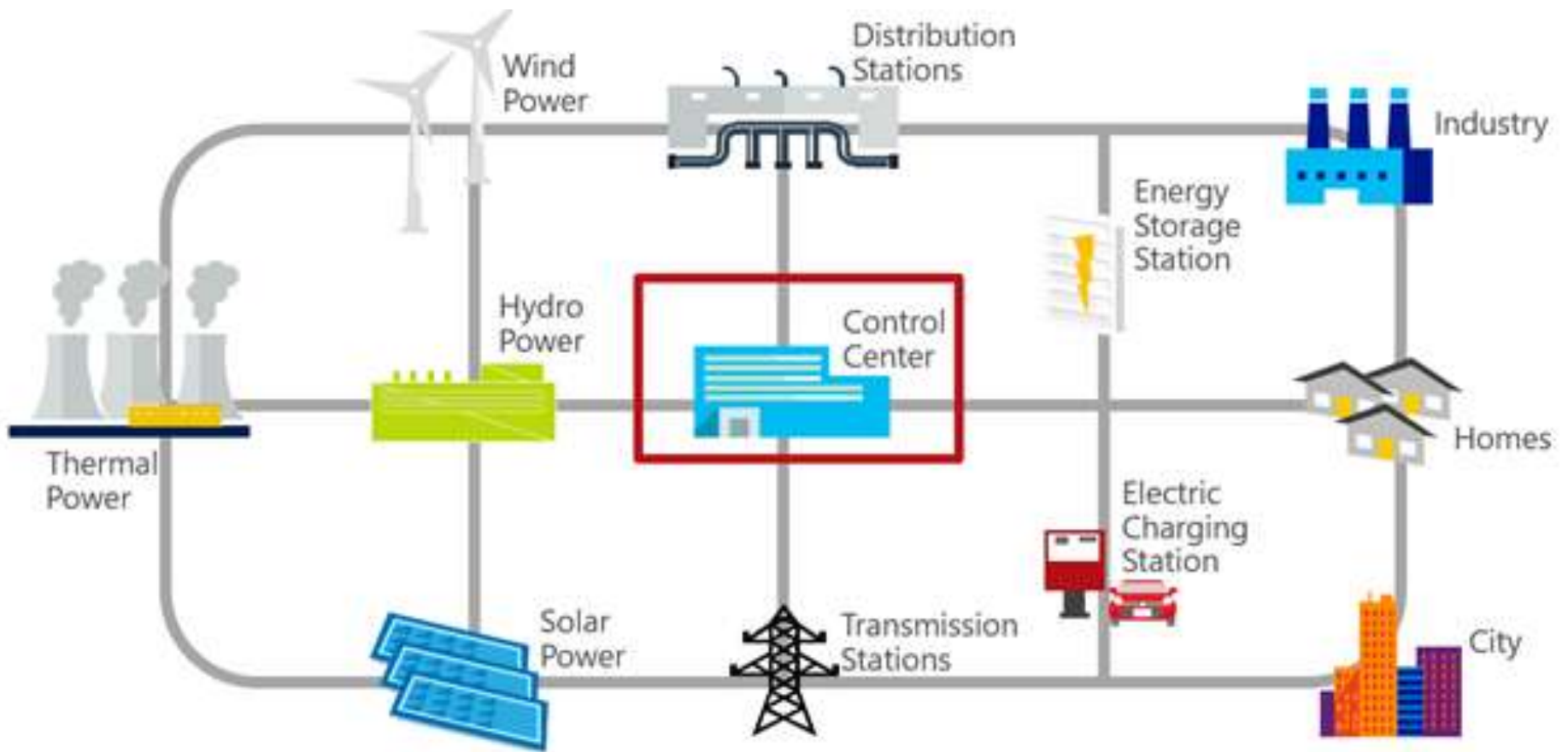
Application for research

- ▶ In Energy
- ▶ In Routing
- ▶ In Living



Application for research

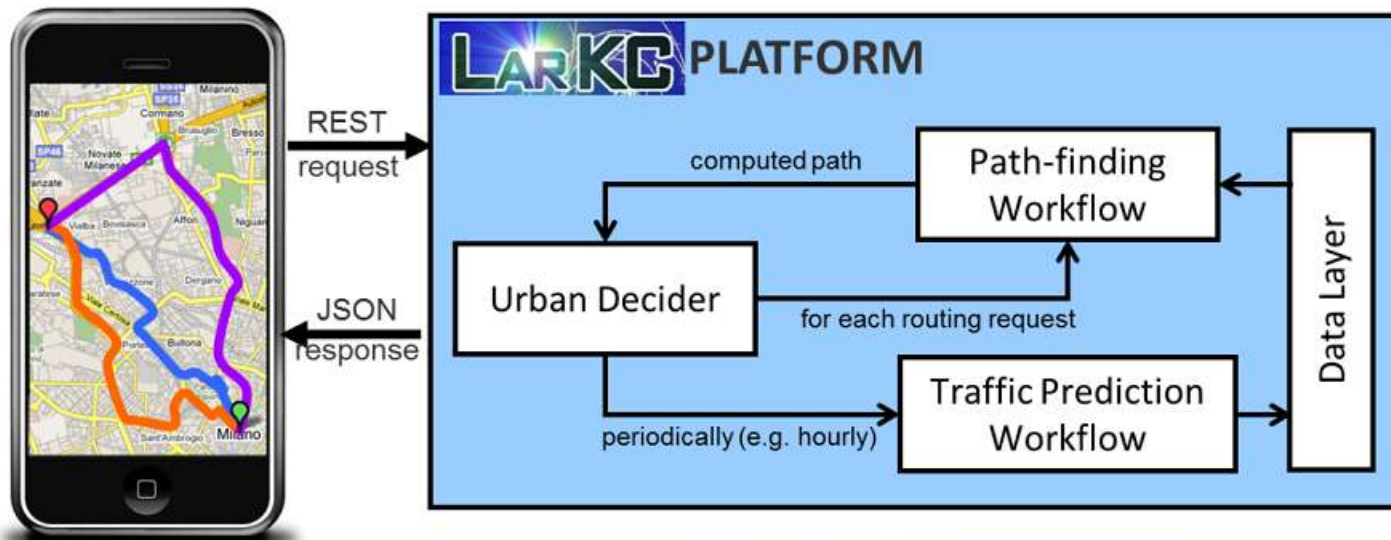
► In Energy





Application for research

► In Routing



Streets
30K links
100K nodes



Traffic
300 sensors
3 years

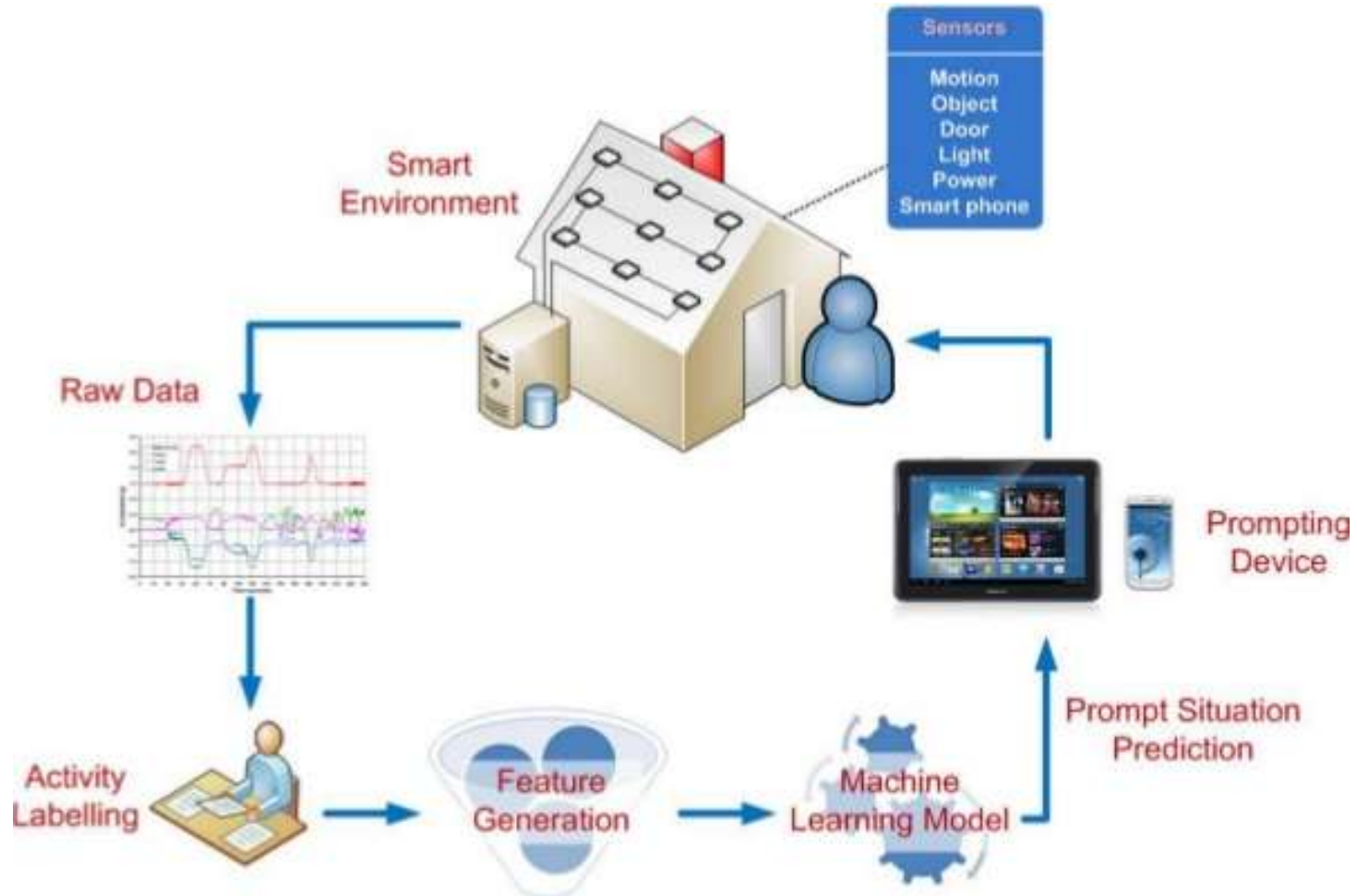


Weather
3 years



Calendar

► In Living





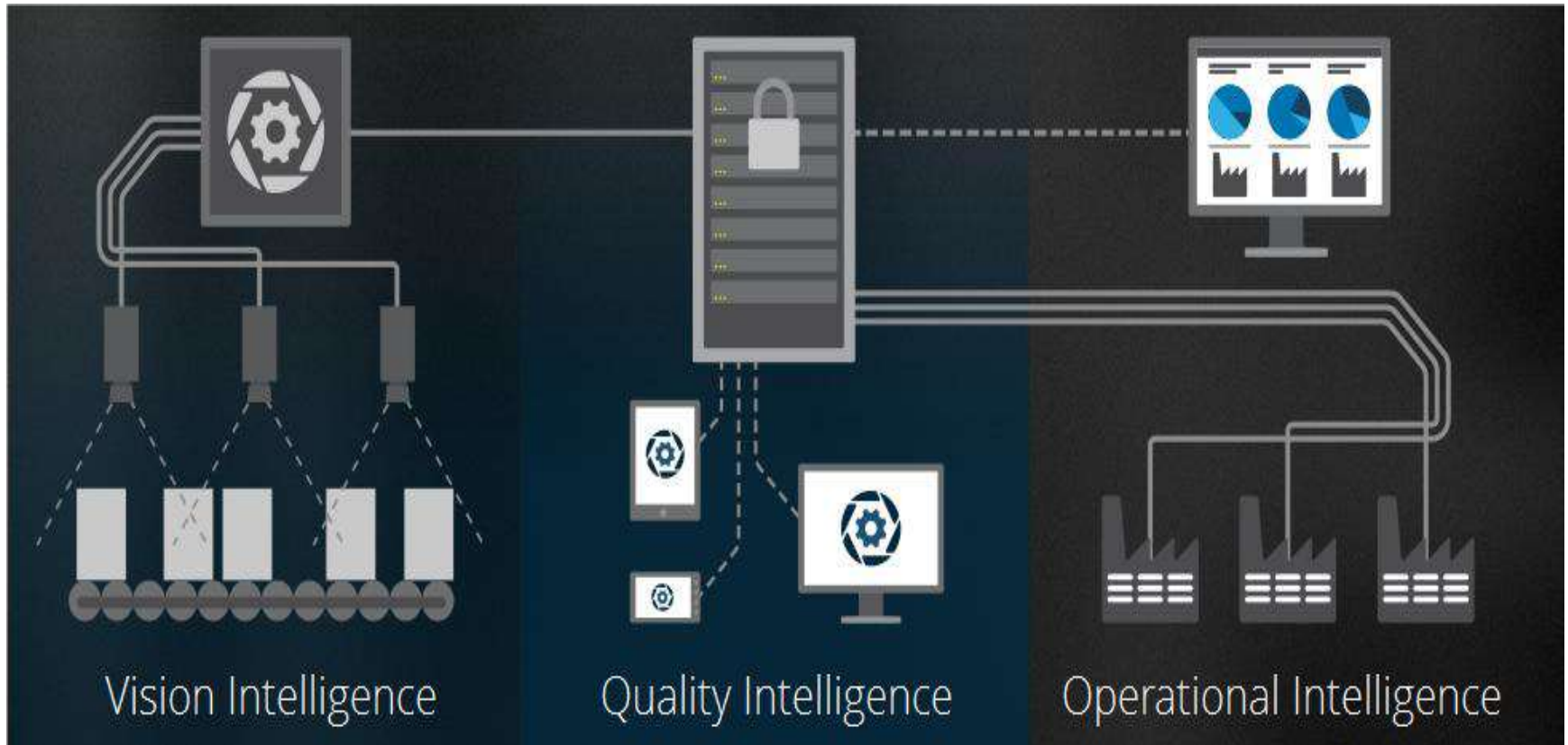
Application in industry

- ▶ **Utilities (energy, water, gas)**
- ▶ **Manufacturing**
- ▶ **Healthcare**
- ▶ **Insurance**
- ▶ **Consumer goods and retail**
- ▶ **Transportation**



Application in industry

► In Modern Manufacturing



► In Healthcare

Wearables



ABI Research has projected that by 2016, wearable wireless medical device sales will reach more than 100 million devices annually.

H₂O.ci
Machine Intelligence



Application in industry

► In Retail





Application in industry

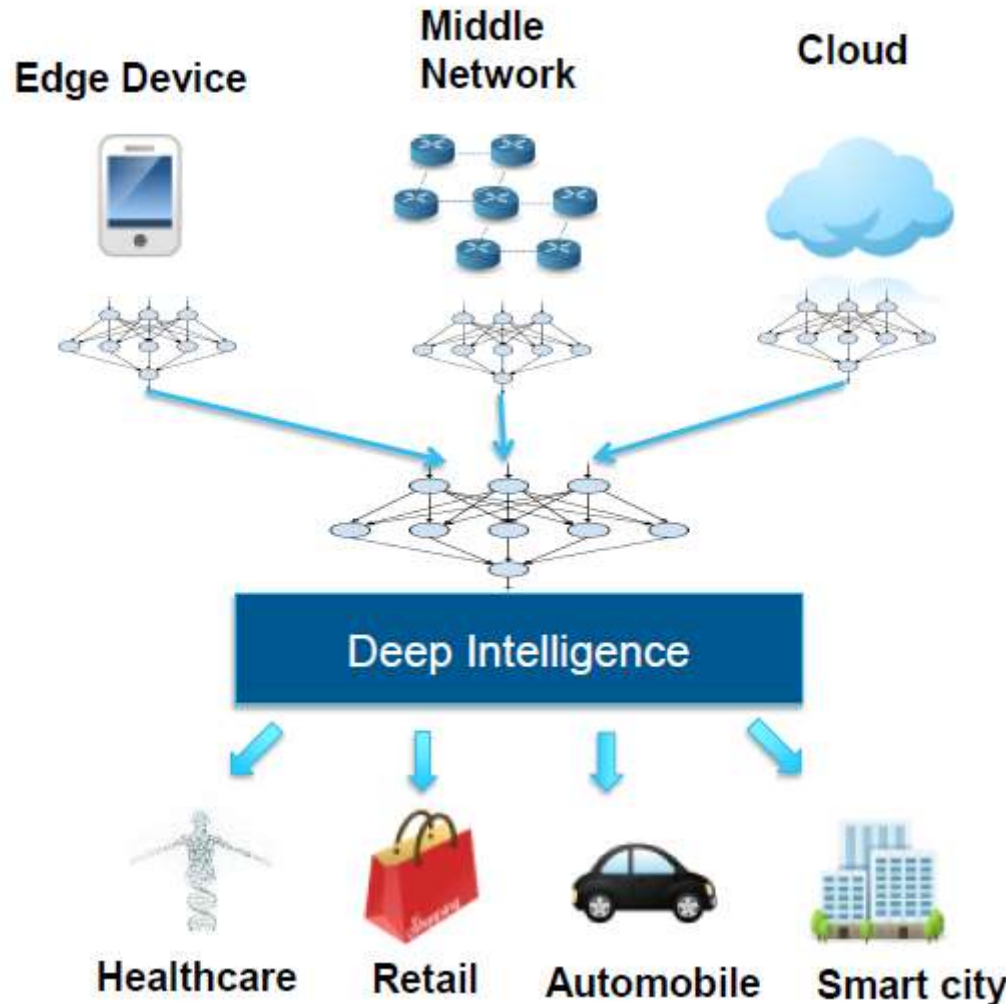
► In Transportation





Application in industry

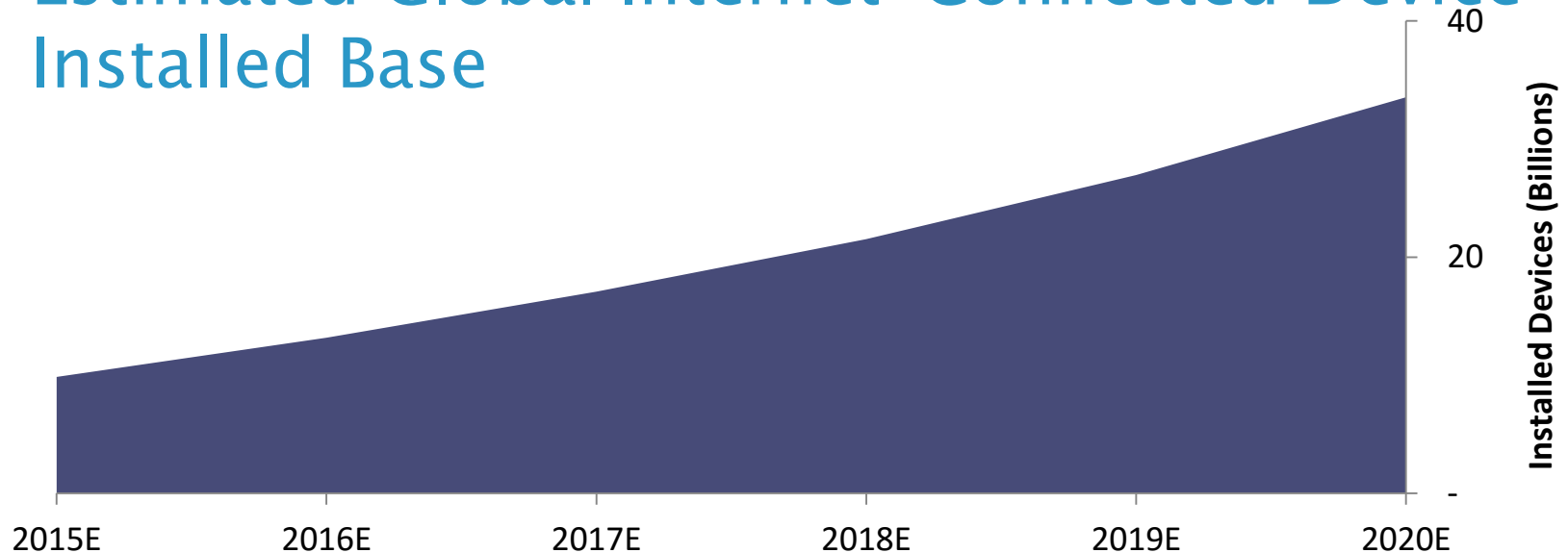
▶ Deep learning (fog clouding)





By 2020, 34 billion devices will be connected to the internet

- ▶ Estimated Global Internet-Connected Device Installed Base

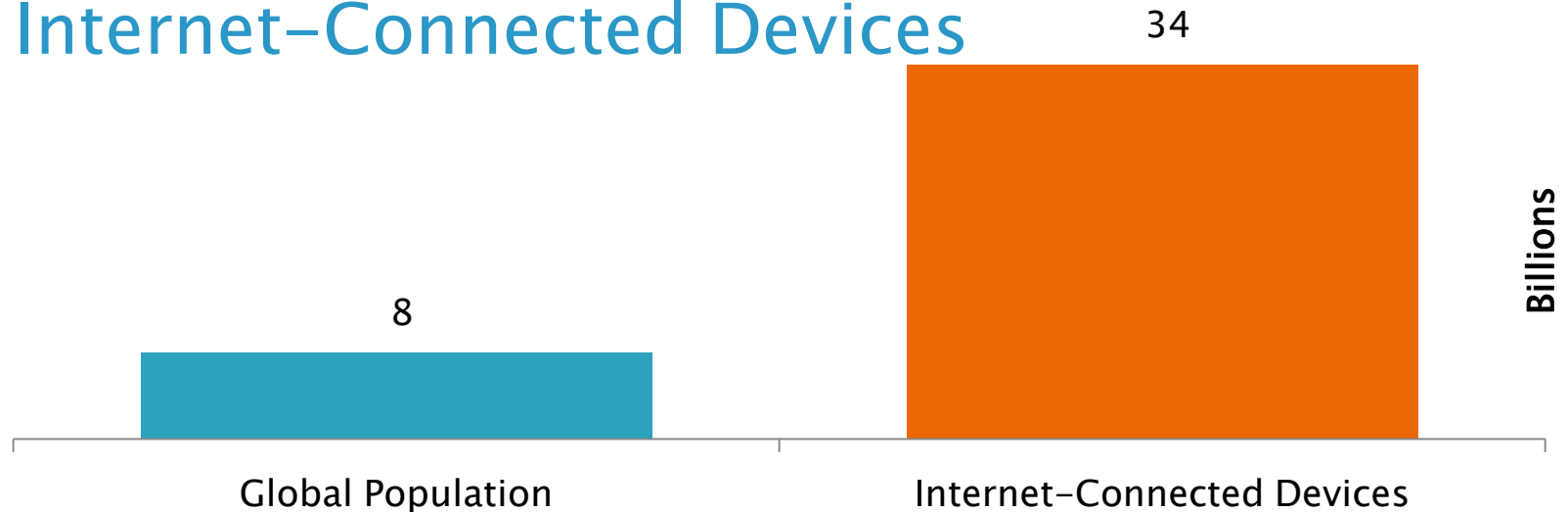


- ▶ Source: BI Intelligence Estimates, 2015



That's More than 4 devices for every human on earth

- ▶ 2020 Estimated World Population Vs. Internet-Connected Devices

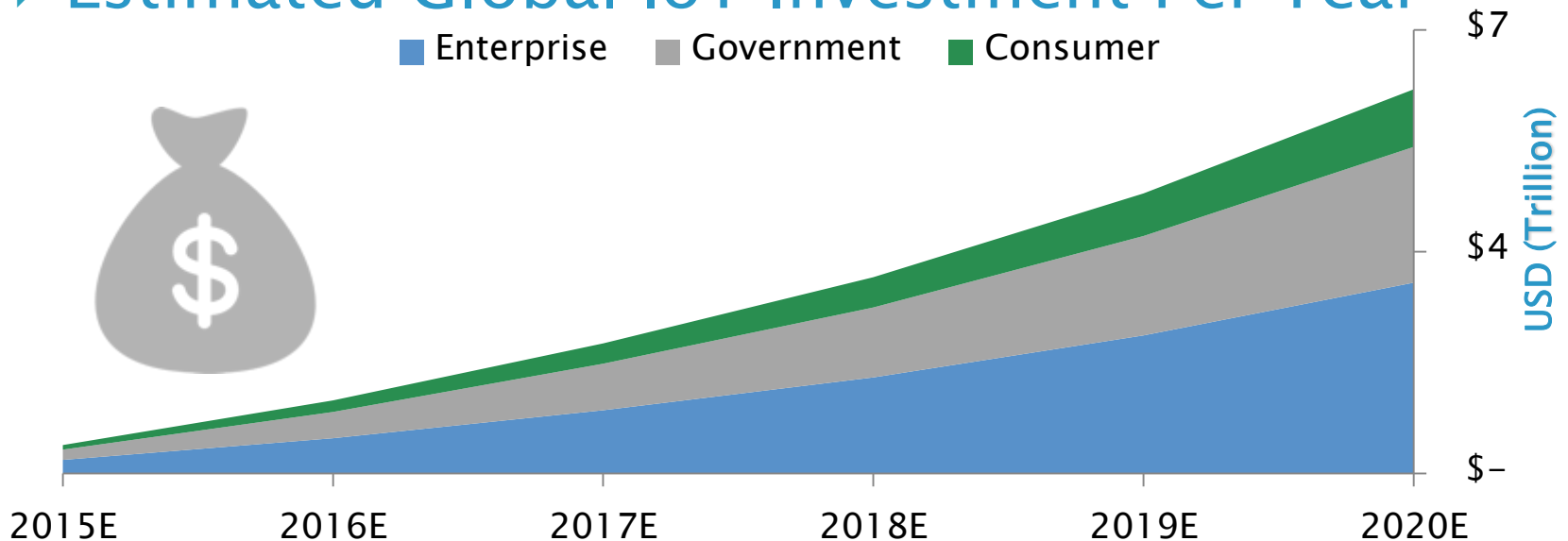


- ▶ Source: UN, BI Intelligence Estimates



In Total, \$6 Trillion will be invested on IoT solutions between 2015-2020

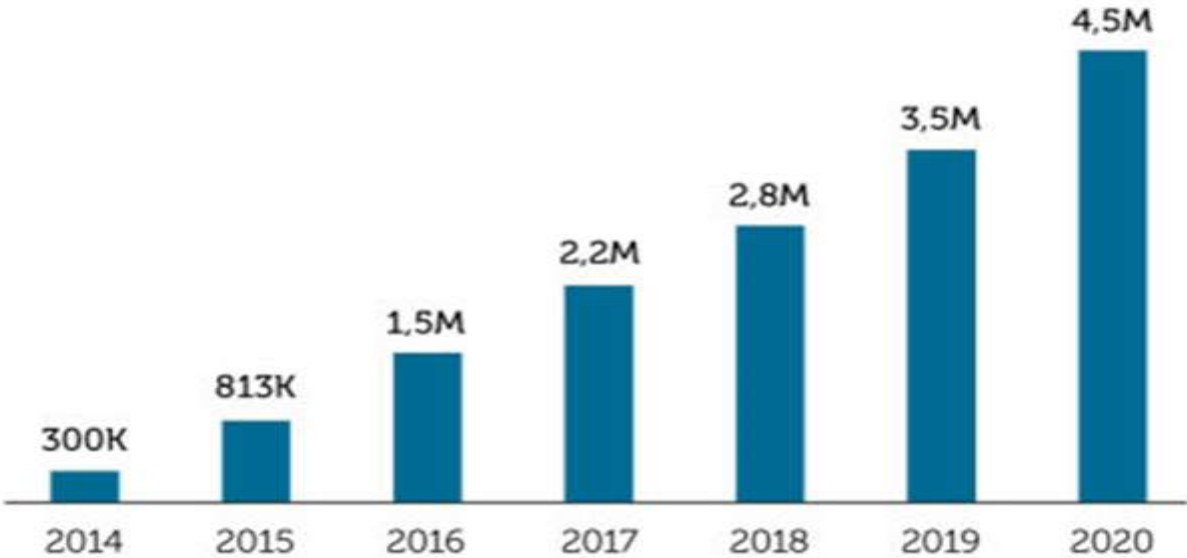
▶ Estimated Global IoT Investment Per Year



▶ Source: BI Intelligence Estimates, 2015



THE NUMBER OF IOT DEVELOPERS 2014-2020



Source: VisionMobile estimates, 2014



Report: IoT: Breaking Free From Internet And Things | vmob.me/IoT
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IoT Required Skill

- ▶ **Security and Data Analytics**
- ▶ **Business Intelligence**
- ▶ **UI / UX Design**
- ▶ **Mobile / Remote Development**
- ▶ **Hardware Engineering**
- ▶ **Networking**



ML Required Skill

- ▶ **Python / C++ / Java**
- ▶ **Probability and Statistics**
- ▶ **Applied Math and Algorithms**
- ▶ **Distributed Computing**
- ▶ **Expanding the Expertise in Unix Tools**
- ▶ **Learning more about Advanced Signal Processing techniques**
- ▶ **Love Coding and Researching 😊**



3S Overview

Company Name: 3S International Software JSC (3S)

Established: 20th June 2012

Number Employees: 96 (Jan 2016)

Headquarters: 3rd Floor, Kim Anh Building, No1/78 Duy Tan
Dich Vong Hau, Cau Giay, Hanoi, Vietnam
TEL: +84-4-3795-6671
Fax: +84-4-3795-6670

Businesses:

Our key services

- ❖ Offshore SW Development & Maintenance
 - ❖ DM solution consultant
 - ❖ Online system development
 - ❖ Mobile application development
 - ❖ Logistic system integration
 - ❖ Quality Assurance & Testing
-

Presence:

Vietnam Ha Noi (Head Office)
Vietnam Da Nang (Rep. Office)
Japan (Rep.Office)





References

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- ▶ <http://www.slideshare.net/barnandas/machine-learning-challenges-for-automated-prompting-in-smart-homes>
- ▶ https://en.wikipedia.org/wiki/Internet_of_things
- ▶ https://en.wikipedia.org/wiki/Machine_learning
- ▶ <http://www.fastlaneus.com/blog/2015/04/21/6-skills-needed-for-the-internet-of-things/>
- ▶ <http://bigdata-madesimple.com/7-key-skills-required-for-machine-learning-jobs/>
- ▶ <http://www.slideshare.net/0xdata/machine-learning-in-modern-medicine-with-erin-ledell-at-stanford-med>