

IOT cybersecurity

Prepared by Dr. Abdelrhman Ahmed

Lecture 1

جامعة الجميع الذكية

تسعى لتكون الكيان الأول الذي يتبنى مبدأ المجتمع التعليمي
التعاوني ويقدم العلم مقابل العمل لتنمية وبناء المجتمعات.

IoT Development History and Overview



جامعة الجميع الذكية
EVERYONE'S SMART UNIVERSITY

- Internet of Things (IoT) is an important part of the new generation of information technologies and an important development phase in the information era.
- IoT is widely used in network convergence using communications and sensing technologies, such as intelligent sensing, identification, and pervasive computing. Therefore, IoT is called the third wave of global information industry development after computers and the Internet.

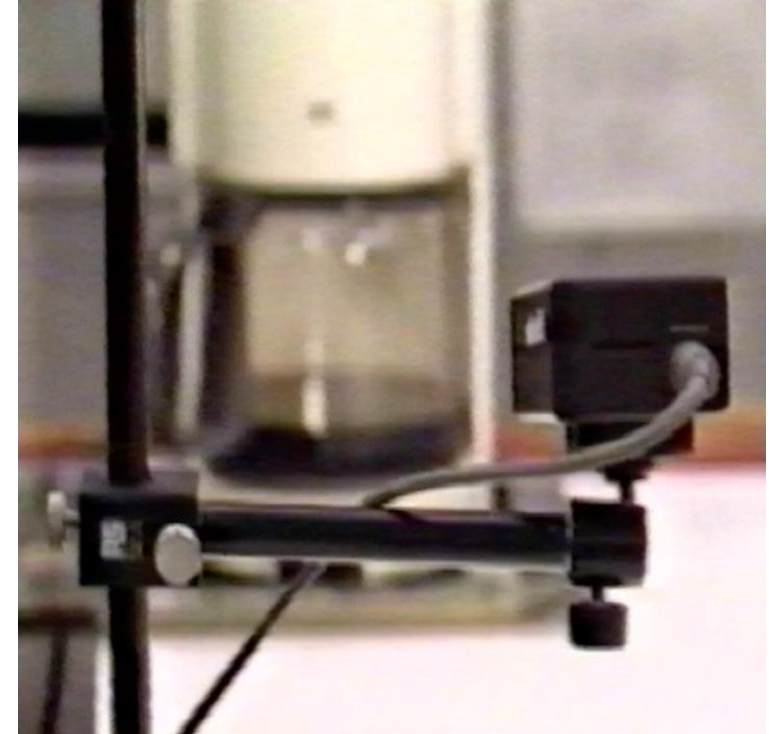
- On completion of this course, you will have an understanding of:
 - IoT development history
 - Basic IoT concepts
 - Layers of the IoT architecture



Chapter 01

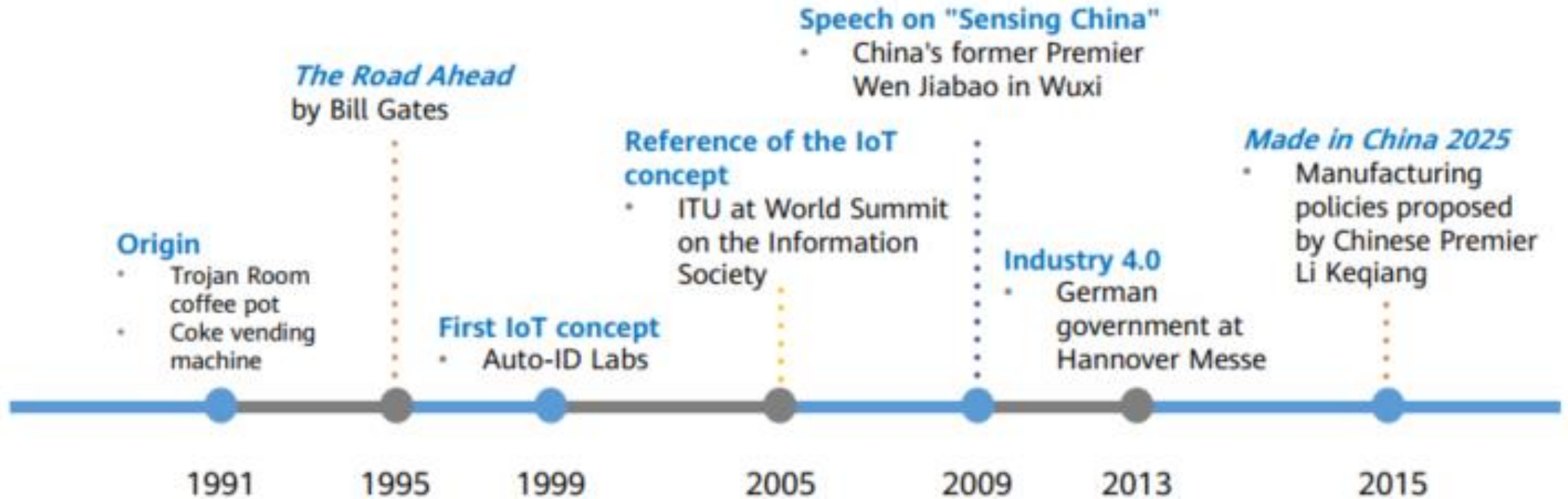
Origin of the IoT

- ❑ Trojan Room coffee pot in 1991: At the Trojan Room of the Computer Laboratory in Cambridge University, scientists went downstairs to see if the coffee was cooked, but often returned empty-handed.
- ❑ To solve this problem, they wrote a set of programs and installed a portable camera next to the coffee pot. The camera was aimed at the coffee pot. Computer image capture technology was used to check at any time whether the coffee was cooked, eliminating the need to go up and down the stairs.



Chapter 01

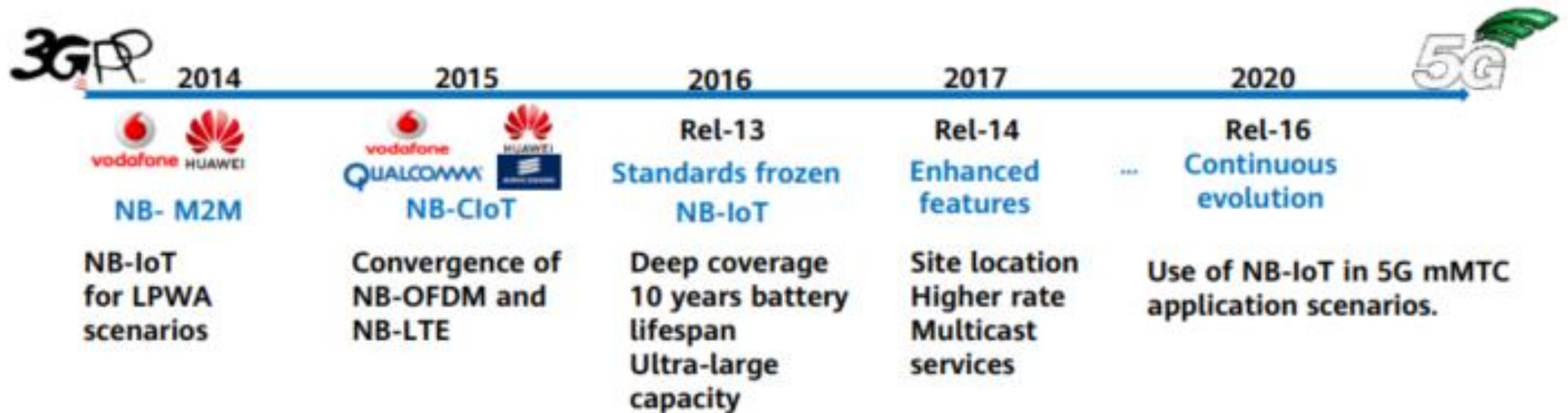
Development of the IoT



Chapter 01

IoT Key Events: Evolution of NB-IoT Standards

The standards of the narrowband cellular IoT (NB-IoT) communications technology NB-IoT were officially initiated in September 2015, and the core standards were frozen in June 2016.



After two convergences, NB-M2M evolved to NB-IoT.

On October 31, 2019, China Telecom, China Mobile, and China Unicom jointly announced the launch of 5G commercial services and released corresponding packages at the opening ceremony of the China International Information Communication Technology Exhibition. 5G will bring diversified and comprehensive benefits to IoT, and will also promote new solutions and industry chains.



Chapter 01

Development Status of the IoT Industry: Consumption-Driven

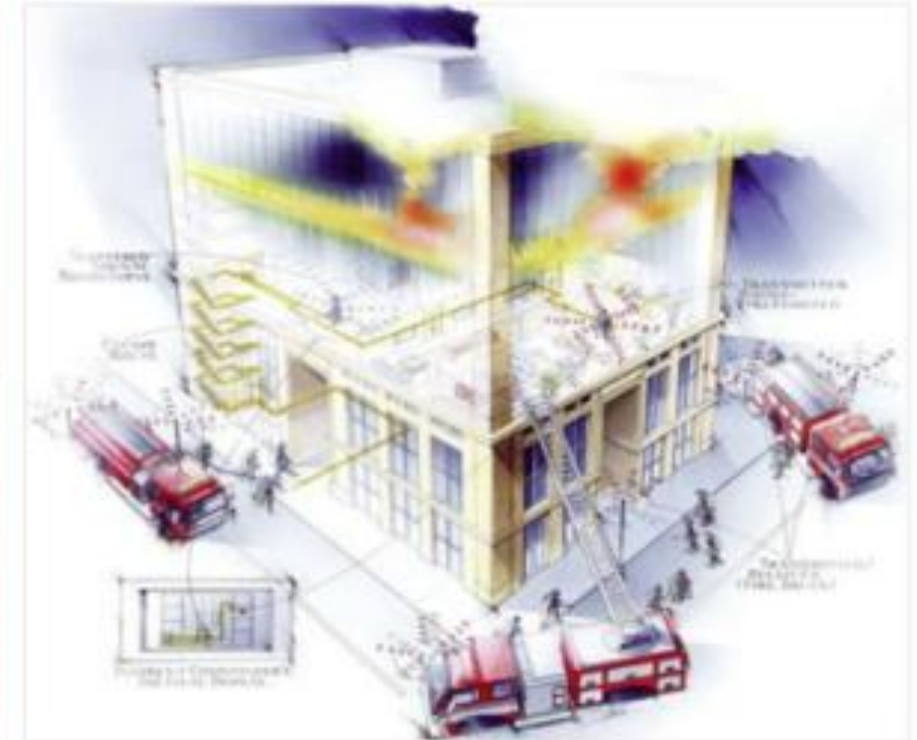
Consumer IoT is directly applied to consumers' IoT products and services. Consumer-related IoT products and services include smart bands, VR and AR glasses, body fat scales, smart locks, smart speakers, shared bicycles and trams, and automated driving vehicles. According to a report released by Markets and Markets, the global consumer IoT market scale in 2018 was \$46.8 billion USD. It is expected to reach \$104.4 billion USD by 2023 with a compound annual growth rate of 17.39% from 2018 to 2023.



Chapter 01

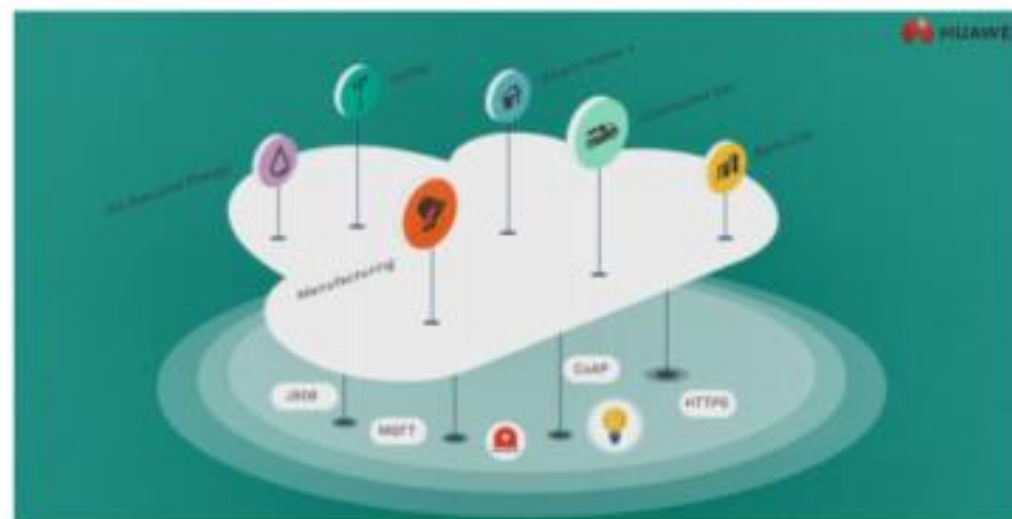
Development Status of the IoT Industry: Policy-Driven

Policy-driven applications mainly cover city management scenarios, such as firefighting, security, system integration, public utilities, lighting, and parking.



Chapter 01

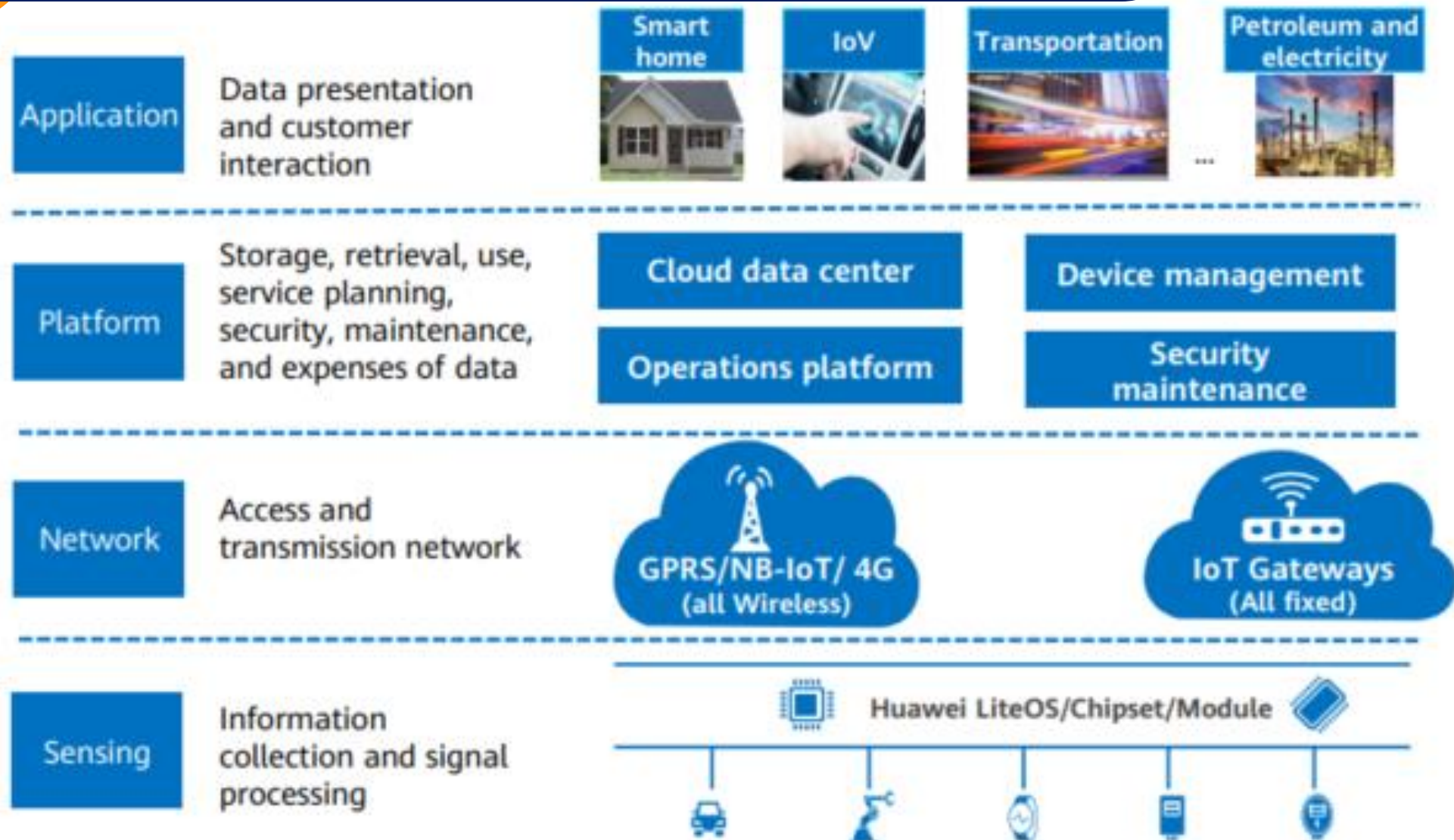
Penetration and Development of IoT in Industries



- The concept of IoT was first proposed by MIT in 1999. The early IoT was a network based on RFID technology and devices. It combined objects with the Internet using the agreed communication protocols to implement intelligent identification and management of objects and realize interconnection and information sharing.
- IoT serves as a network that enables information sensing devices, such as QR code scanners, RFID, infrared sensors, global positioning systems, and laser scanners, to connect any item with the Internet for information exchange and communications based on agreed protocols. As such, IoT can facilitate intelligent identification, location, tracking, monitoring, and management (ITU).
- IoT is an Internet where all things are interconnected. This sentence has two meanings. First, the core and foundation of the IoT is still the Internet. IoT is an extended network based on the Internet. Second, the IoT connects any thing at the user end for information exchange and communication (Baidu Baike).

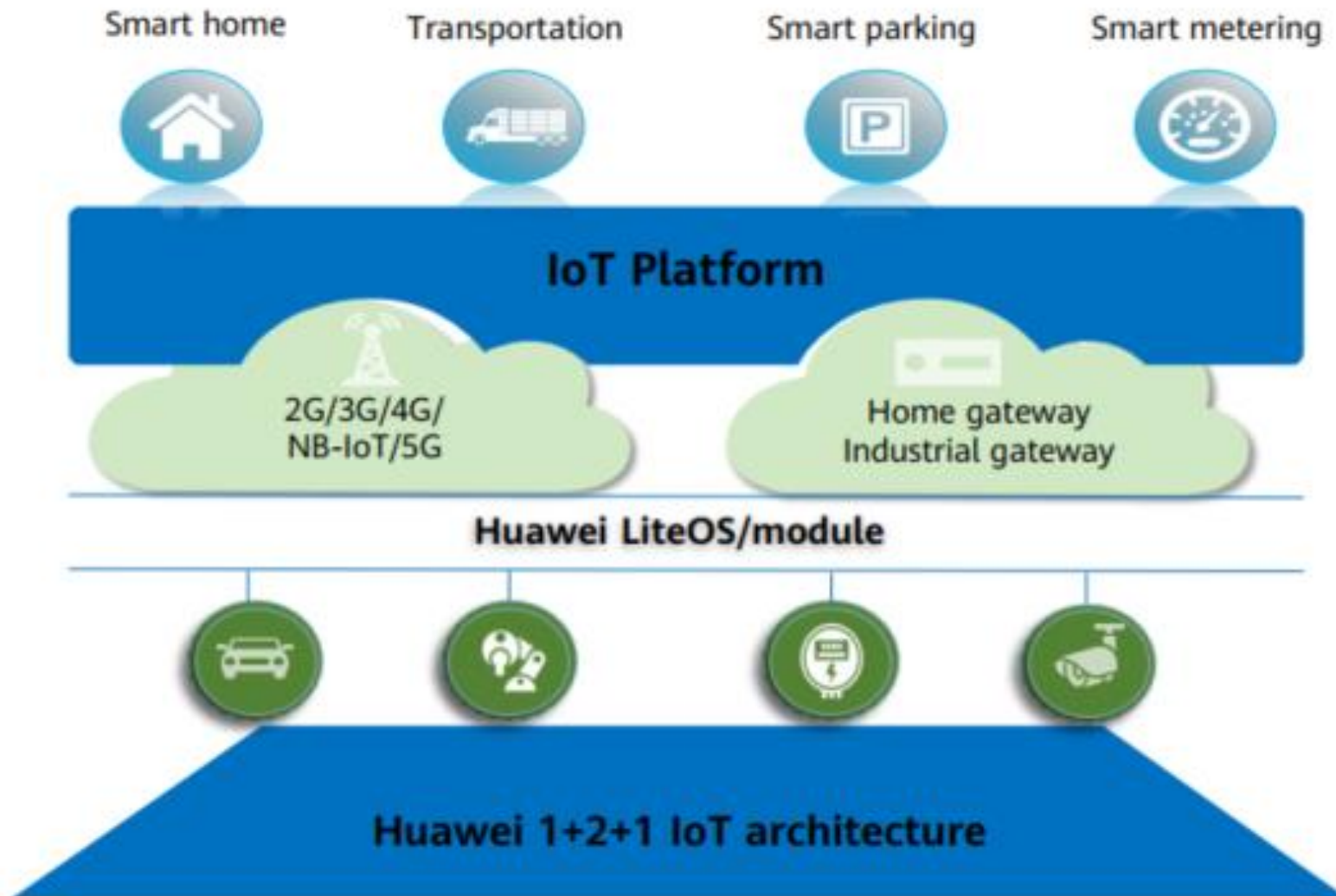
Chapter 01

Layers of the IoT



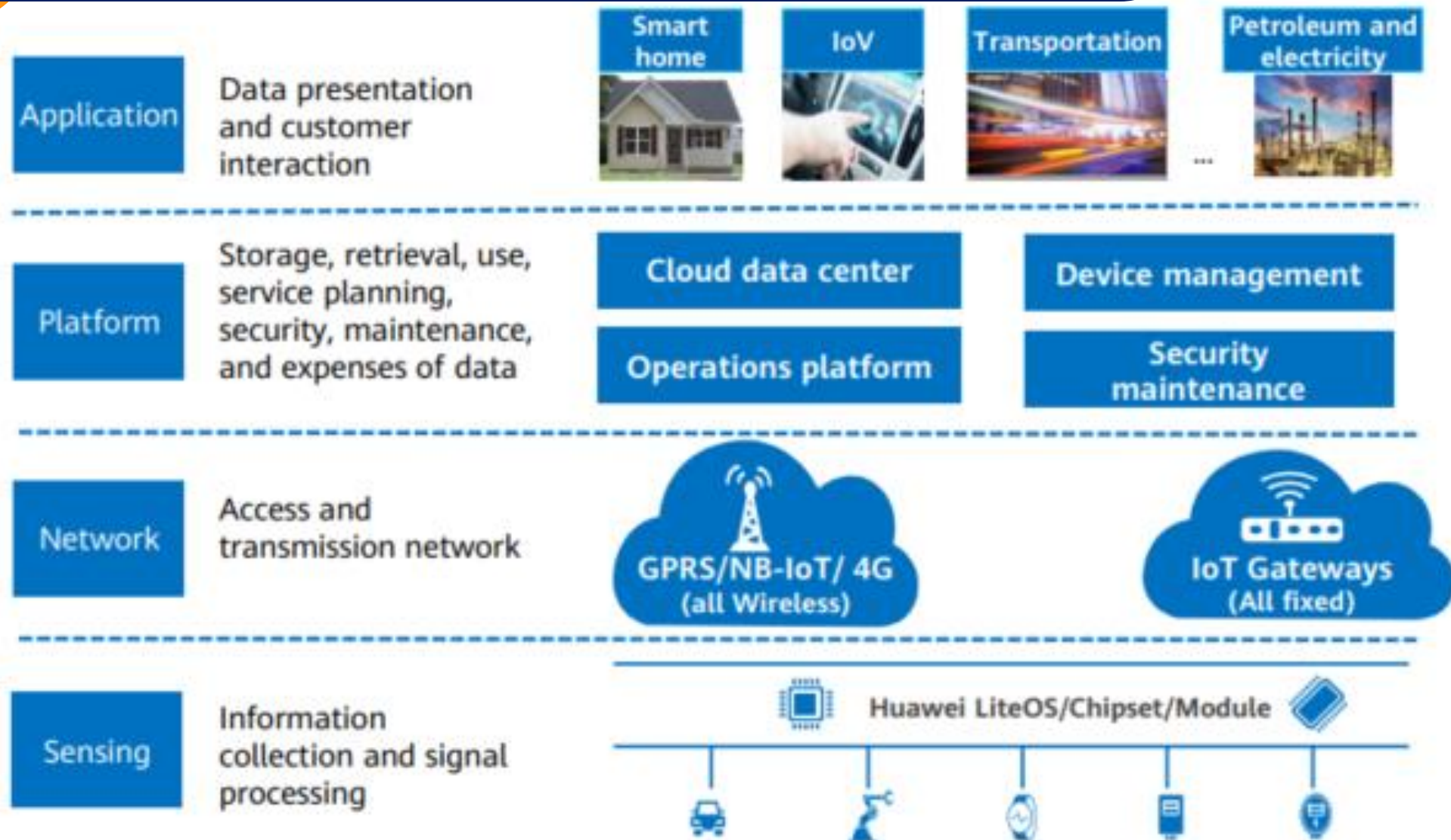
Chapter 01

Huawei 1+2+1 IoT Solution Architecture



Chapter 01

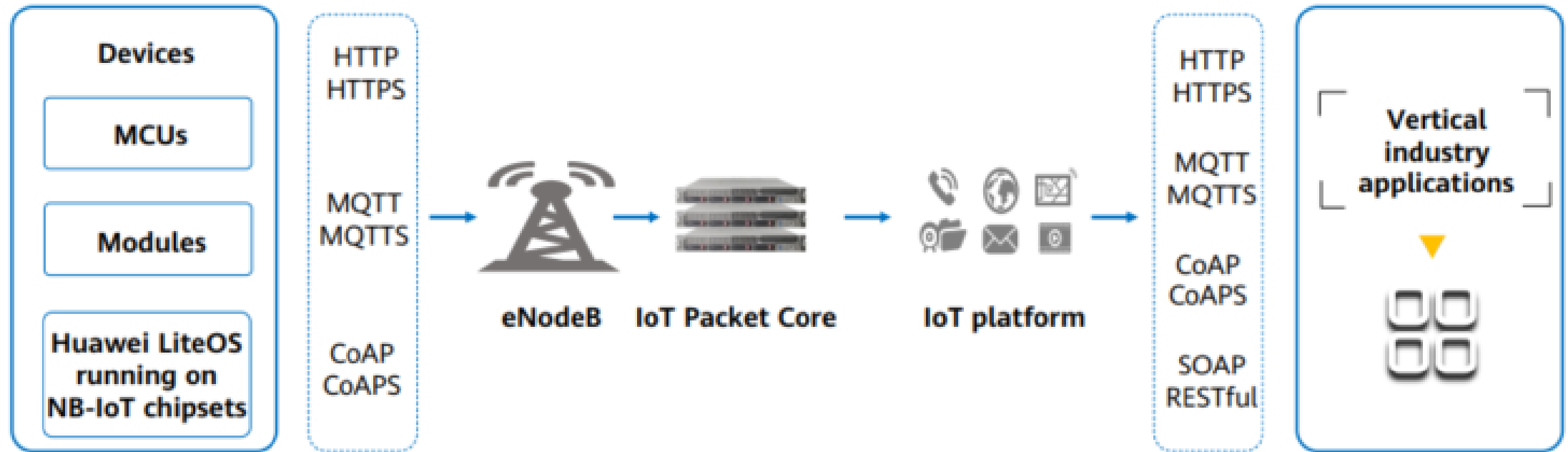
Layers of the IoT



Chapter 01

NB-IoT: Connecting Device Fleets Using Cellular Networks

- NB-IoT end-to-end solution



Chapter 01

Industrial IoT Gateway



....



Agile AR

Industrial switching/Industrial routing/Built-in computing

Industrial-grade design



Shockproof/Waterproof/Dust proof/Anti-electromagnetic

+

Various interface support



ZigBee/RF/Bluetooth/
RS-485/RS-232/DI/DO/more

+

Complex protocol adaptation

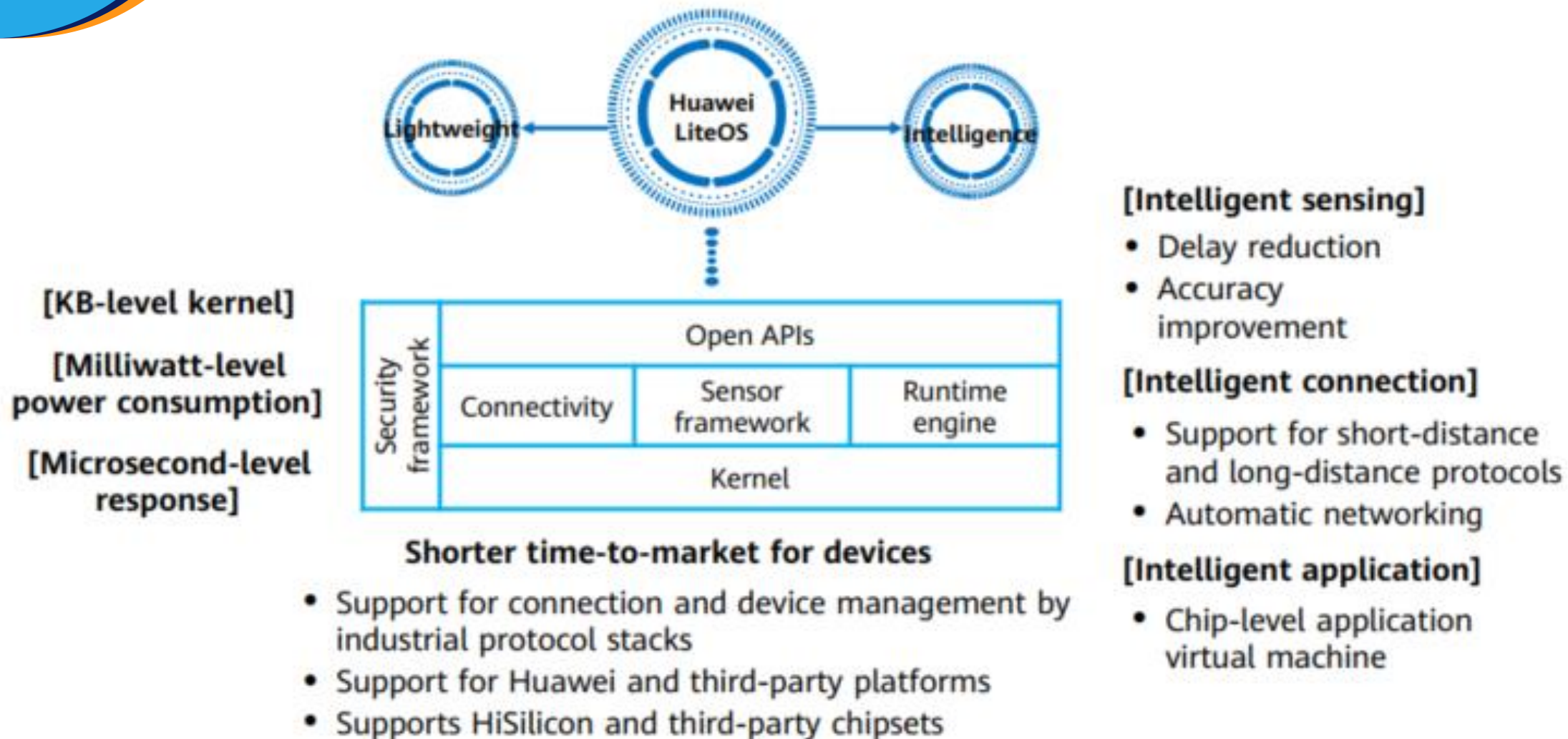
CAN/Modbus/
IEC 62056/IEC 104
/more

+

Local intelligence



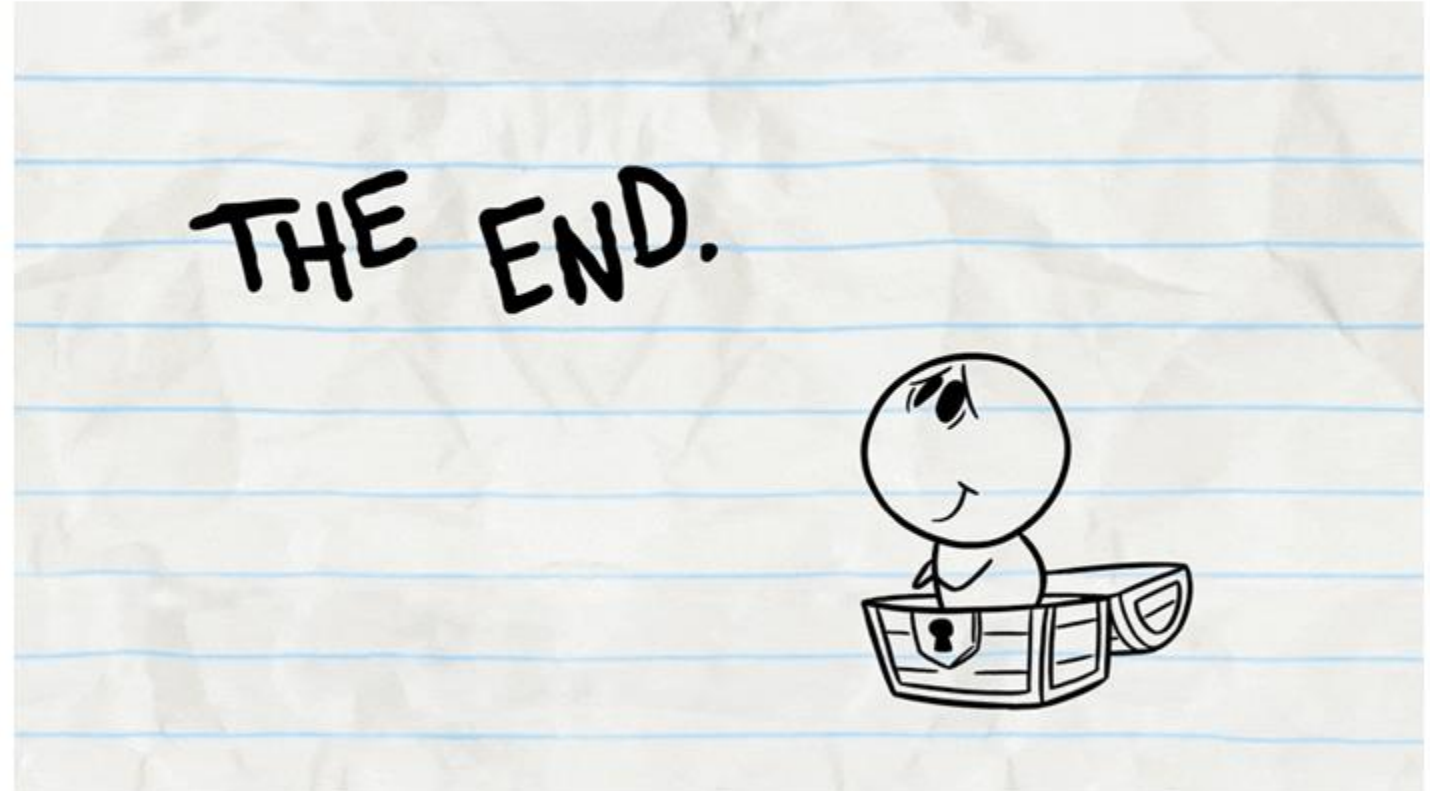
Local computing
and storage



The End

Please feel free to contact me anytime if you have any questions

Abdelrhman Ahmed Refaat:
abdelrhmanahmedrefaat@gmail.com



جامعة القادسية
EVERYONE'S SMART UNIVERSITY