

# IoTtalk: A Platform for IoT Applications Quick Development

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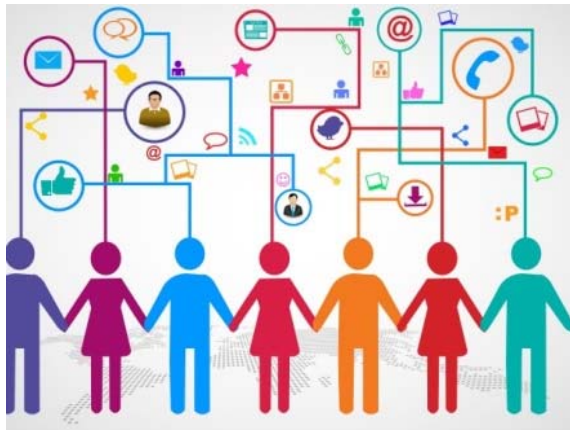
# Outline

- The Evolution of Communication
- What and Why is IoTtalk?
- How to deploy?
- Device Connections with IoTtalk
- IoTtalk System Architecture
- Web-based IoT Applications
- Conclusion

# The Evolution of Communication

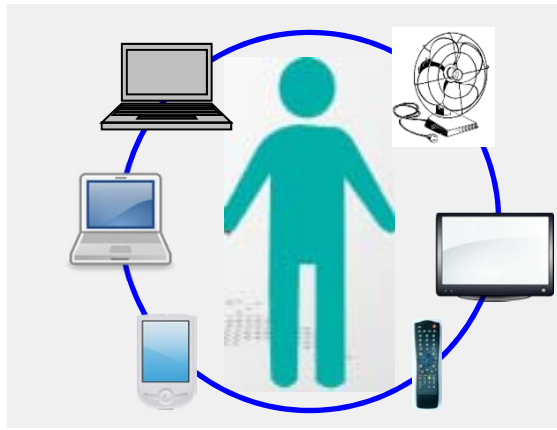
H2H → H2M → M2M

A humans talks to the other humans.



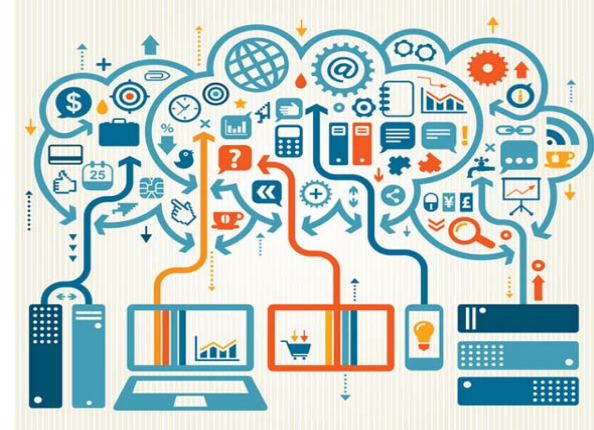
The human talks to the other humans.

A human directly controls the machines.



The human manipulates the machine himself.

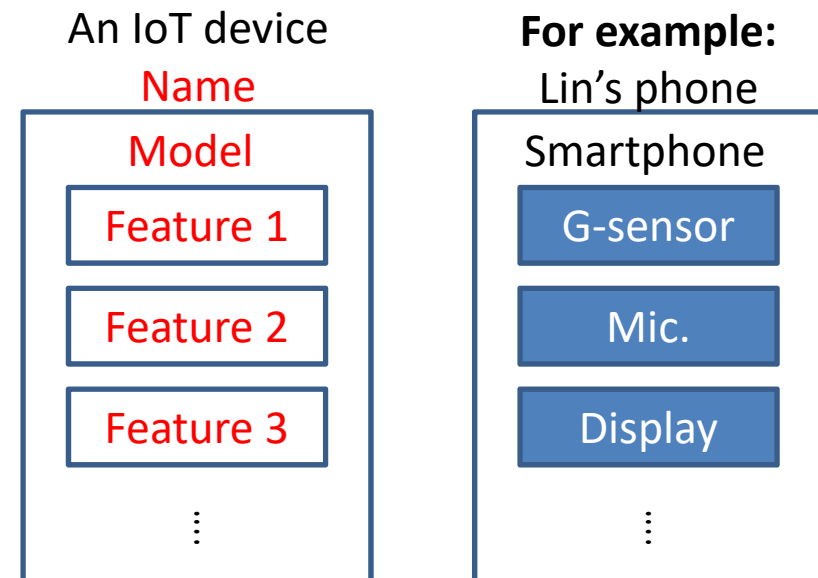
A machine automatically controls the other machines.



Machines have logic or intelligence to manipulate other machines. That is, **IoT devices can talk to each other, IoTtalk!**

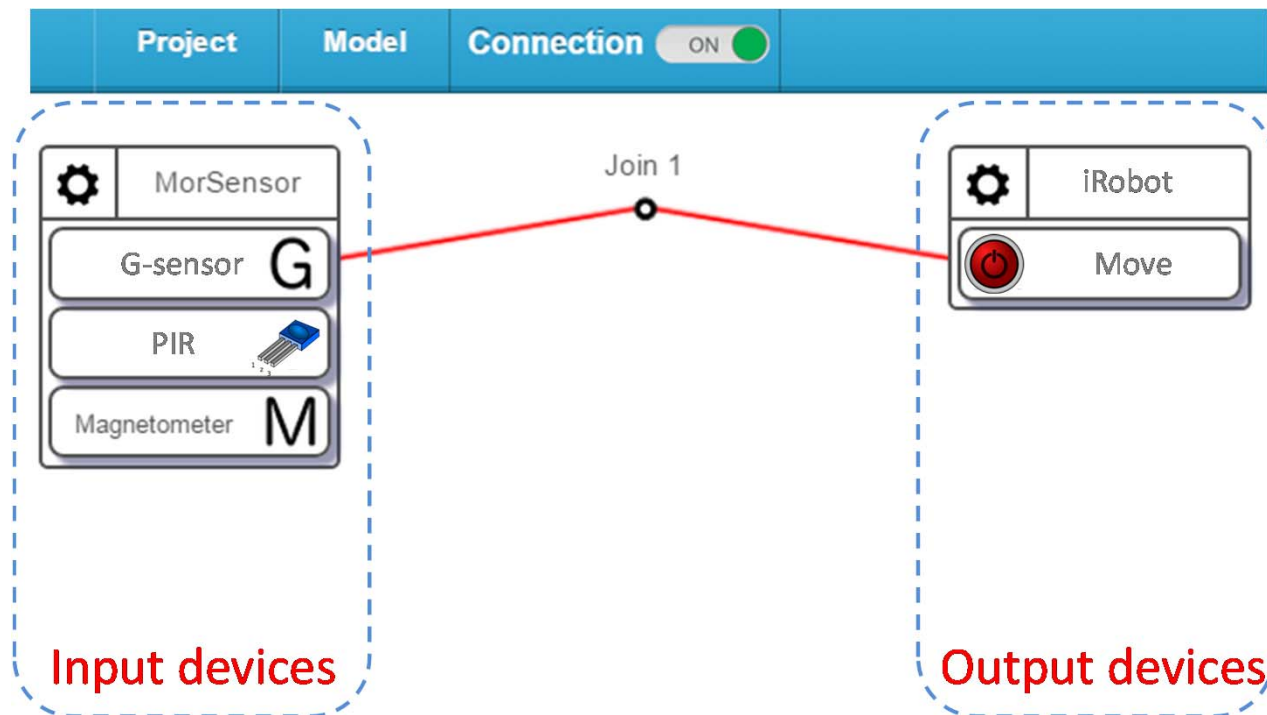
# What is IoTtalk?

- **IoTtalk** is an IoT device management tool
- **IoT management concept**
  - **Device Feature**
    - The function or capability which an IoT can provide
  - **Device Model**
    - A set of device features
    - A device model refers to a specific product
  - **Device name**
    - The name of a specific product



# Why is IoTtalk?

- Applications can simply develop with lower efforts
- Simple and intuitive GUI
- Application development without real devices is feasible



# Simple and Intuitive GUI

- Connections by intuitional drawing links between IoT devices
- Transparently observe the connections between IoT devices
- Monitor the transmitting values between IoT devices
- Application debugging is more easier

The screenshot shows the IoTalk web interface. At the top, there's a navigation bar with tabs: Project21, Model, Connection (selected), and Delete. To the right of the tabs are buttons for Simulation (ON) and a green status indicator. Below the navigation bar, the main workspace displays a diagram with two IoT devices: Koala (labeled 'A' for Acceleration) and Dandelion (labeled 'C' for Color-O). They are connected by a red line labeled 'Join 1'. On the right side, there are two monitoring panels. The top panel is the 'IDF Monitor' with a 'Sub-stage' dropdown set to 'Input'. It shows a table of data with columns for Timestamp, X1, X2, and X3. The bottom panel is the 'ODF Monitor' with a 'Sub-stage' dropdown set to 'Function'. It shows a table of data with columns for Timestamp, Y1,F, Y2,F, and Y3,F. Both tables display data for timestamps 04:10:11, 04:10:12, 04:10:13, and 04:10:15.

IoTalk

140.113.199.200:7788/connection/21#

Project21 Model Connection ON Delete Simulation ON

Koala Acceleration A

Join 1

Dandelion Color-O C

IDF Monitor

Sub-stage: Input Continue Next 1 Acceleration

Timestamp	X1	X2	X3
04:10:11	0.56	0.30	0.16
04:10:12	0.69	0.78	0.79
04:10:13	0.14	0.81	0.61
04:10:15	0.30	0.79	1.00

Input Data Send

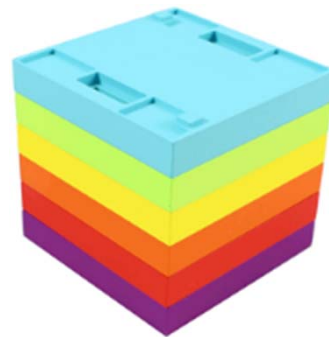
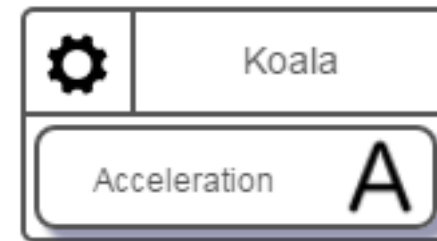
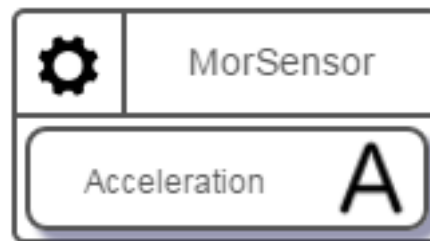
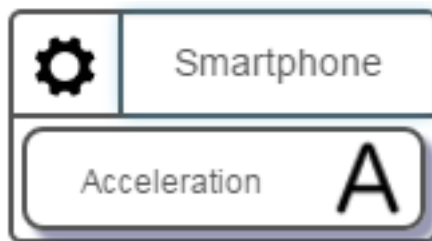
ODF Monitor

Sub-stage: Function 1 Color-O

Timestamp	Y1,F	Y2,F	Y3,F
04:10:11	0.56	0.30	0.16
04:10:12	0.69	0.78	0.79
04:10:13	0.14	0.81	0.61
04:10:15	0.30	0.79	1.00

# Applications can simply develop with lower efforts

- Reusable DF modules
  - Even they are different IoT devices



# Application development without real devices is feasible

- Do not need the real devices first to develop applications
- The simulator provides the numerical values as inputs

The screenshot shows a web-based simulation interface. At the top, there is a blue header bar with the word "Simulation" and a green toggle switch labeled "ON". Below this, the main content area is titled "IDF Monitor". It features a "Sub-stage:" dropdown menu set to "Input", and two buttons: "Continue" and "Next". To the right of these buttons is a dropdown menu labeled "1 Acceleration". Below the controls is a table with four columns: "Timestamp", "x<sub>1</sub>", "x<sub>2</sub>", and "x<sub>3</sub>". The table contains four rows of data.

Timestamp	x <sub>1</sub>	x <sub>2</sub>	x <sub>3</sub>
04:10:11	0.56	0.30	0.16
04:10:12	0.69	0.78	0.79
04:10:13	0.14	0.81	0.61
04:10:15	0.30	0.79	1.00



# Easy to Deploy and Operate



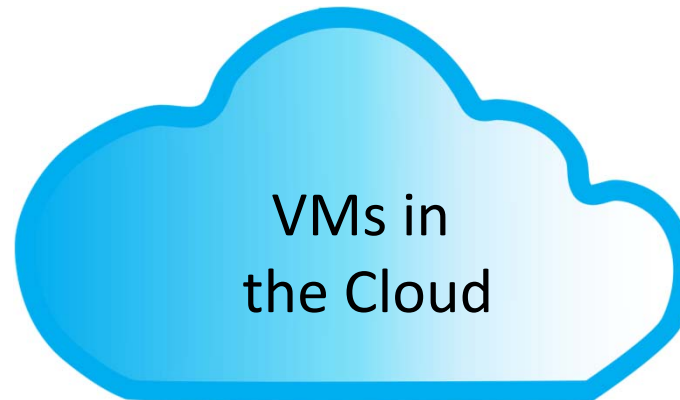
Intel Edison



Raspberry Pi3



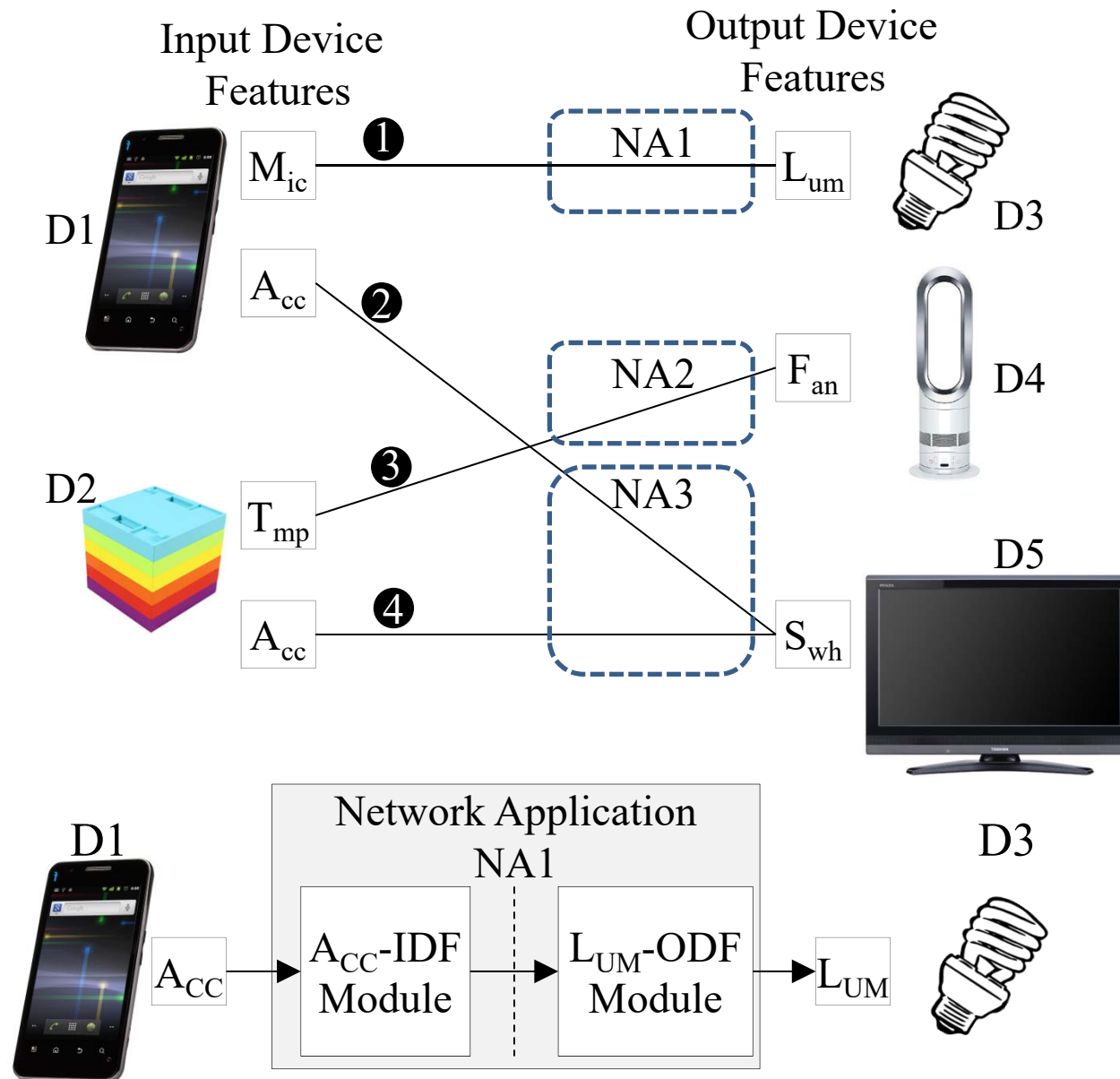
PC server



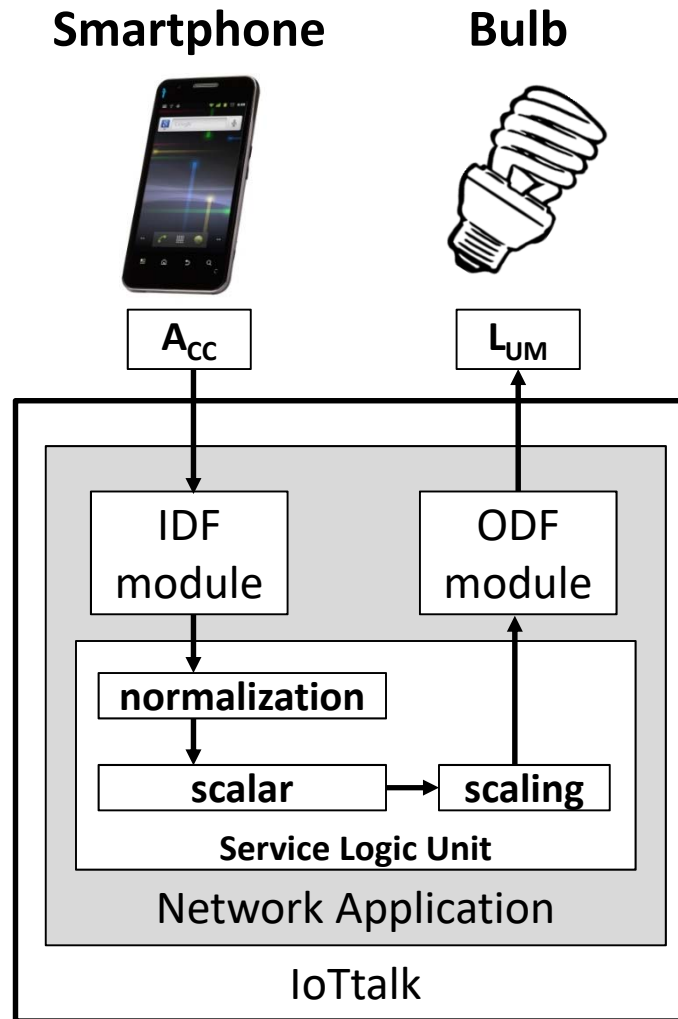
For example, you can try

<http://140.113.199.200:7788/connection>

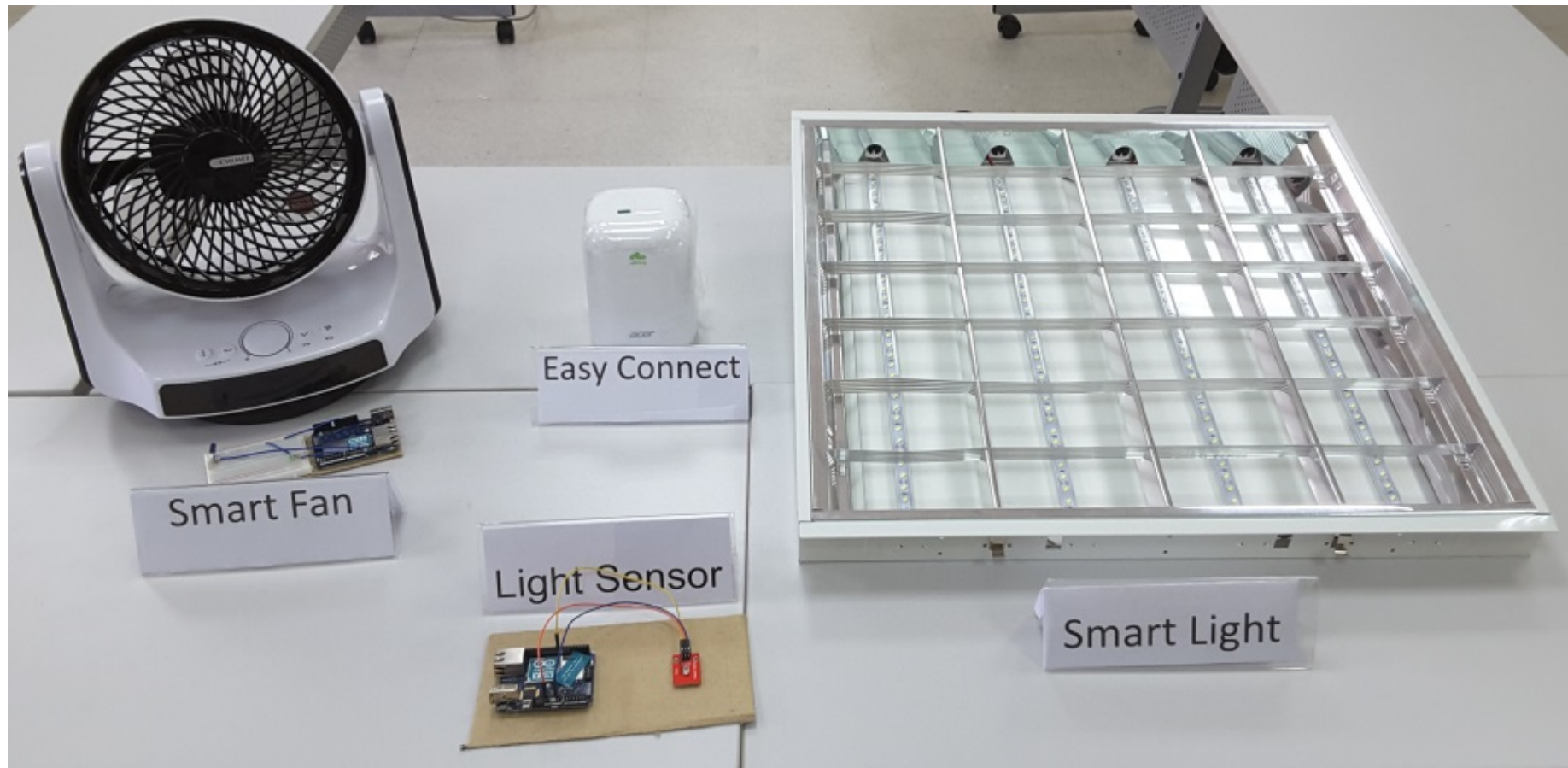
# Appliance Connections with IoTtalk



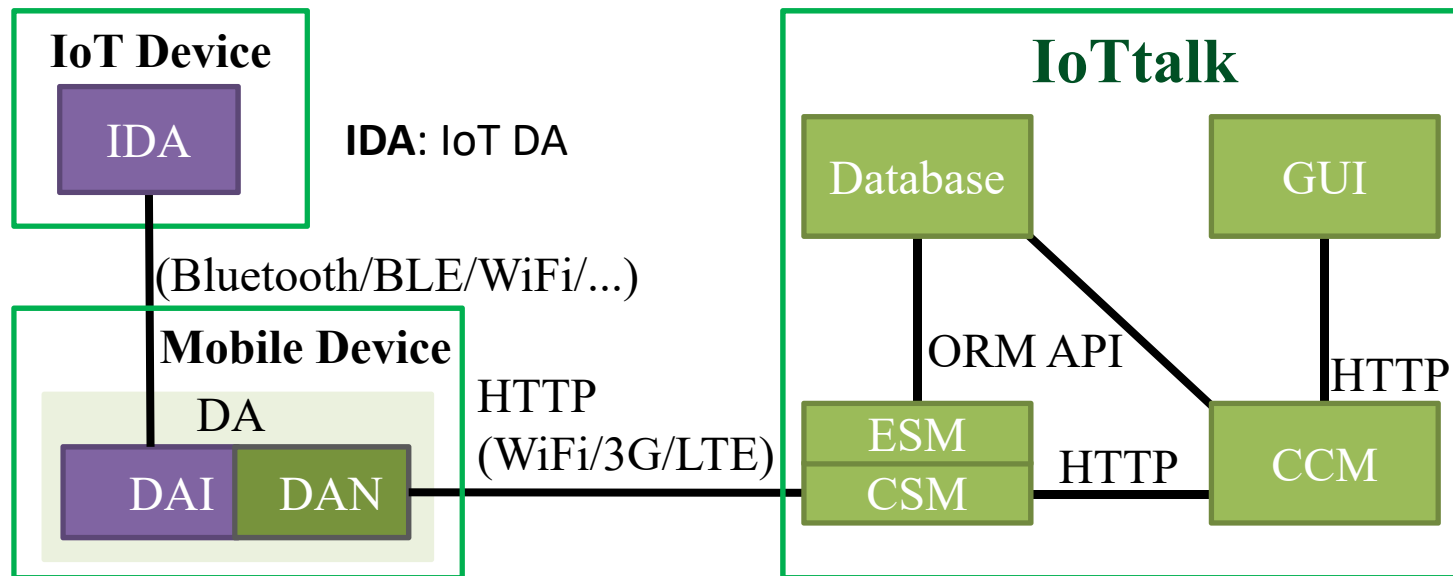
# Connection and Mapping Manner



# Connect Appliances to IoTtalk



# System Architecture



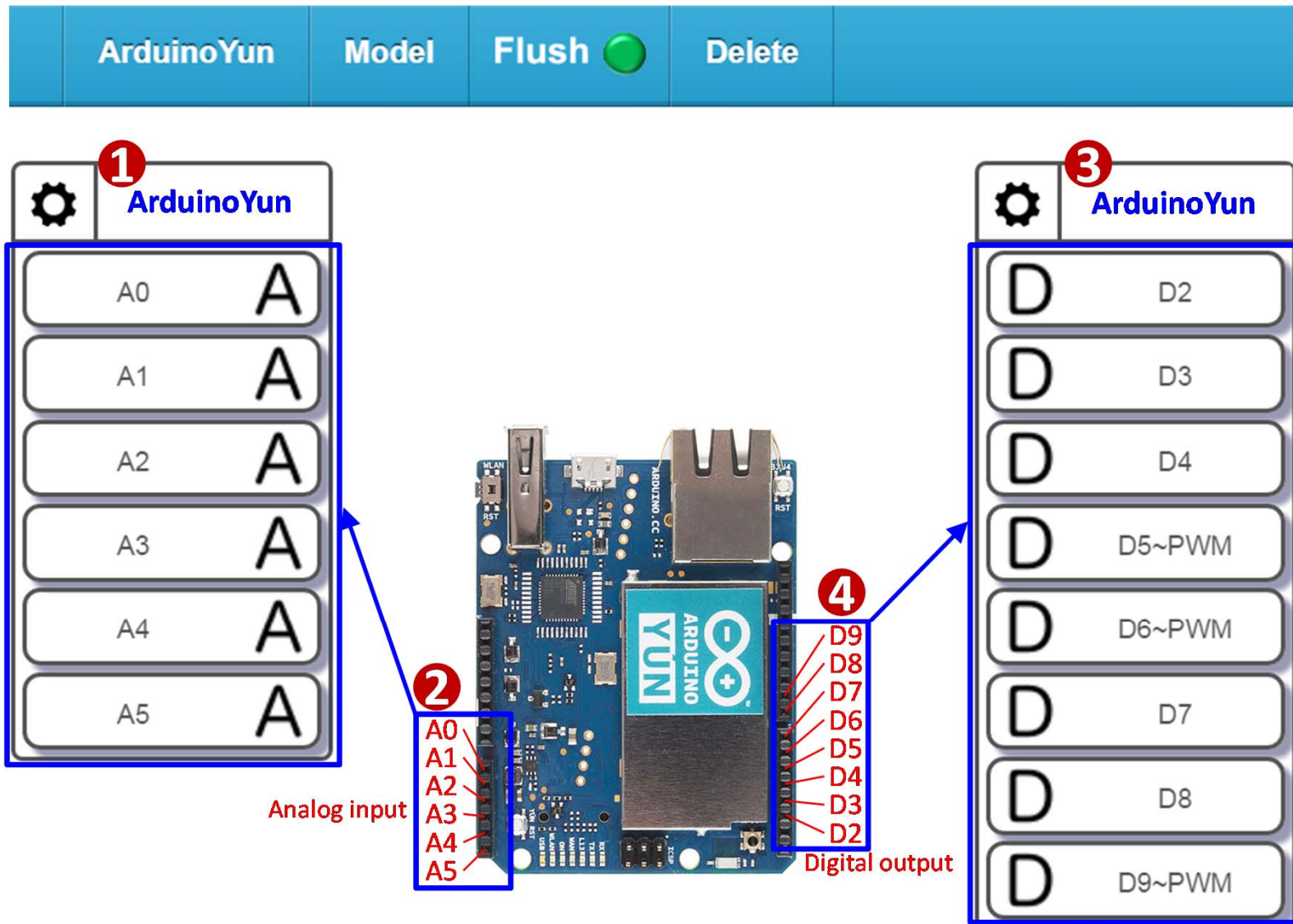
**DA:** device application

**DAN:** DA to Network

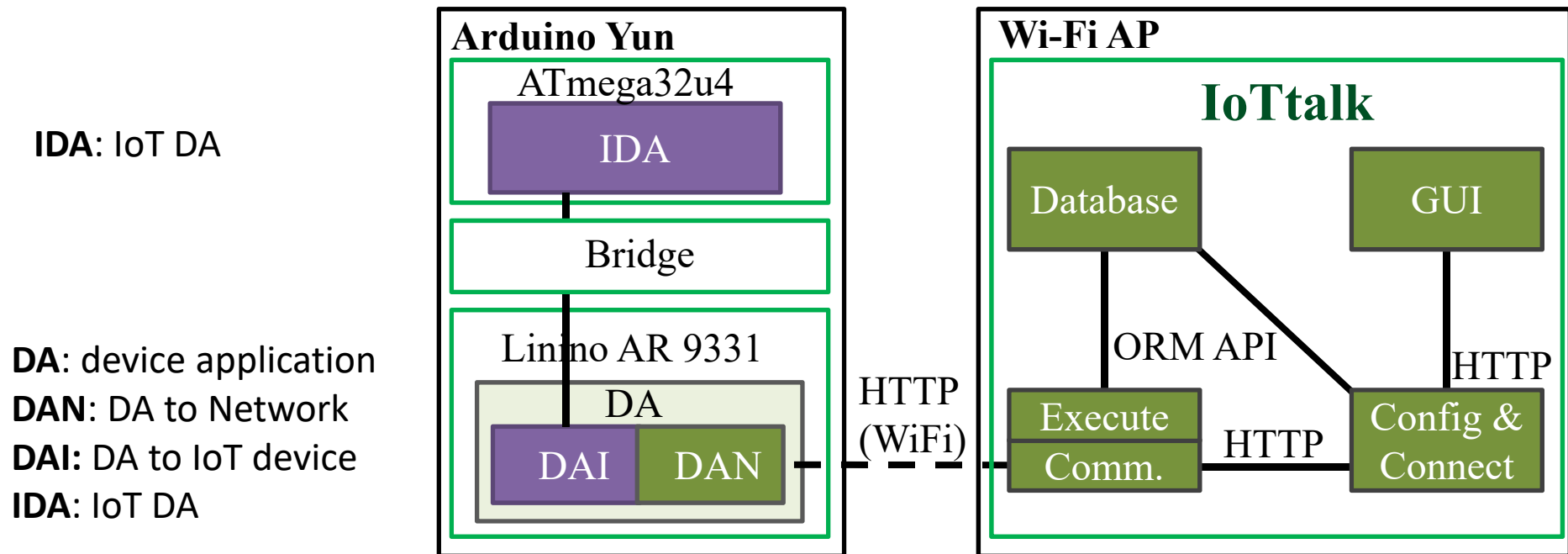
**DAI:** DA to IoT device

**IDA:** IoT DA

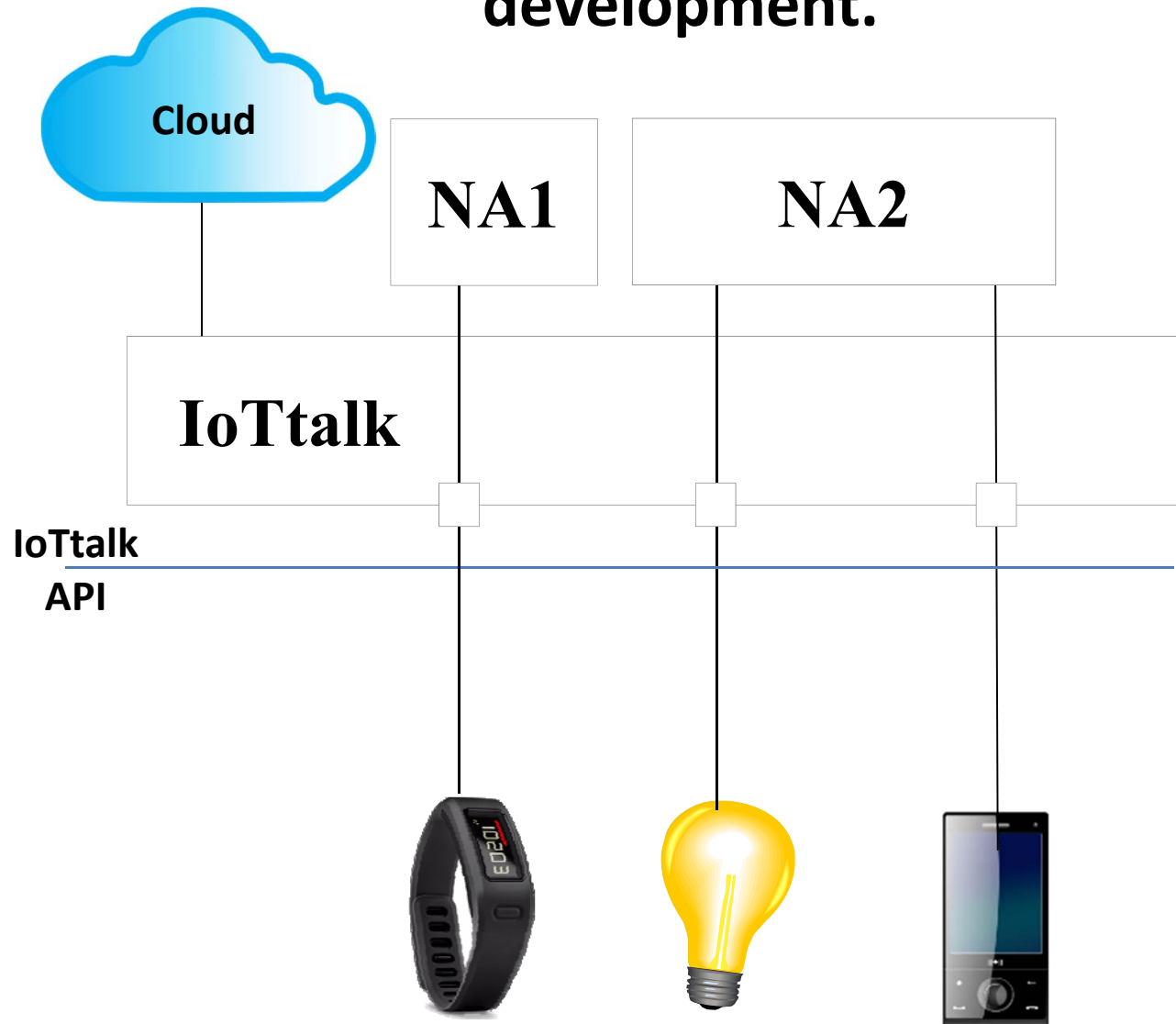
# ArduTalk - IoTtalk and Arduino Yun



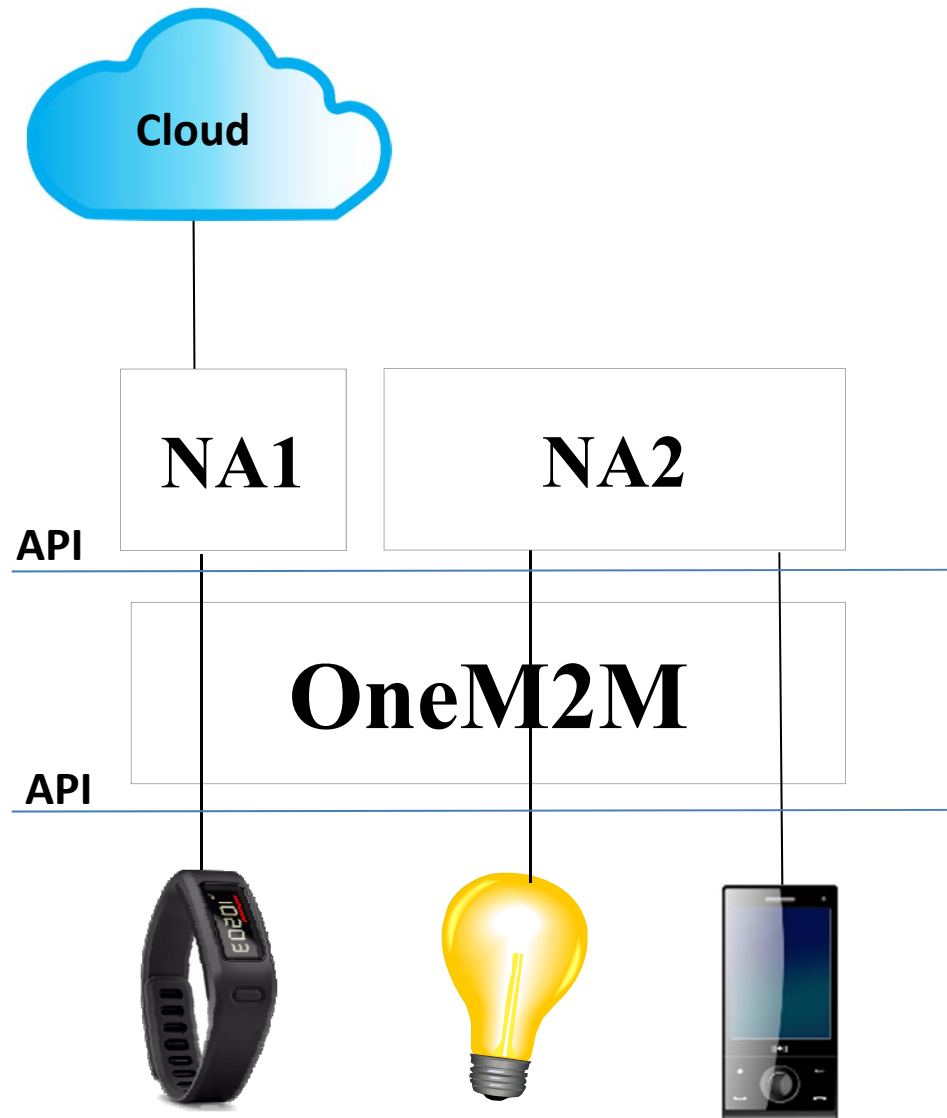
# ArduTalk - IoTtalk and Arduino Yun



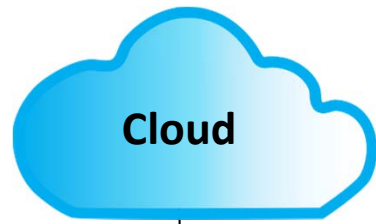
**IoTtalk is a network application platform  
to simplify the network application  
development.**



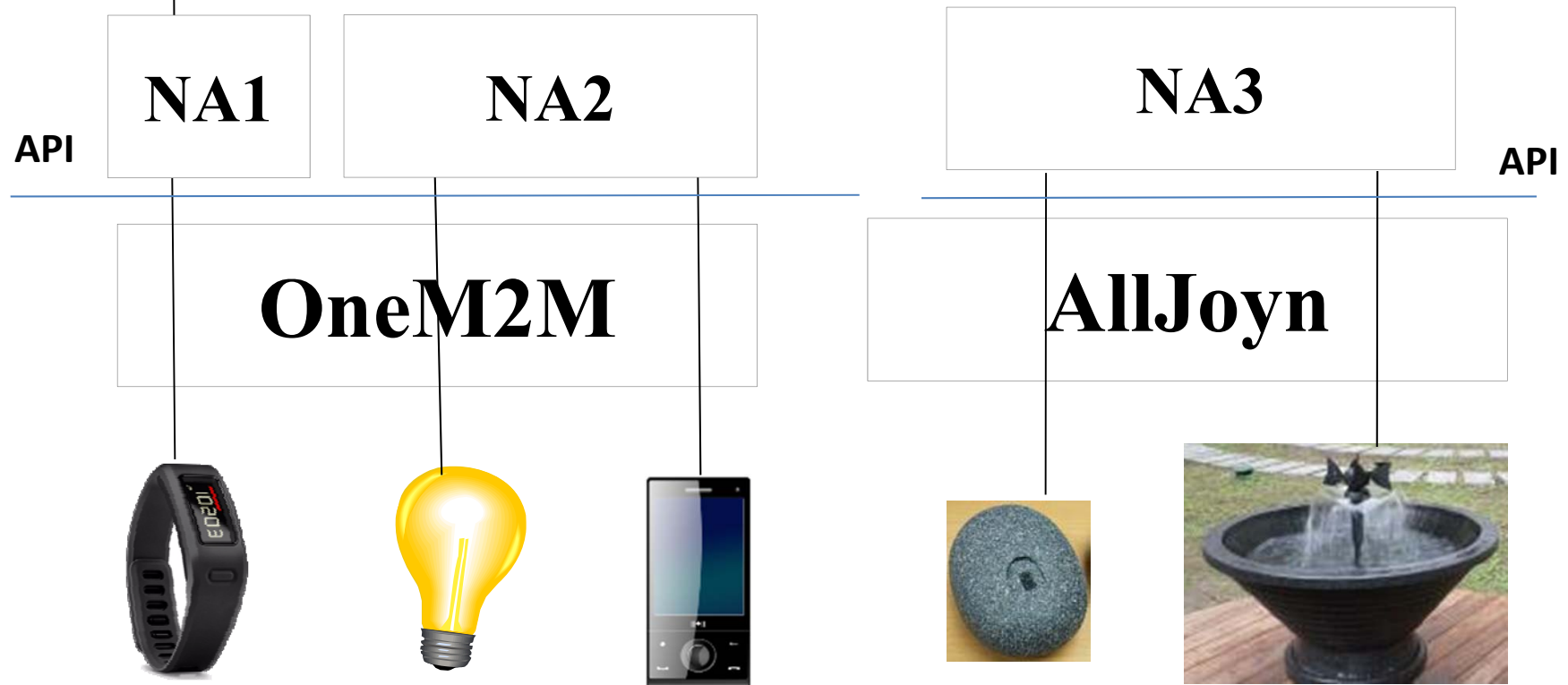


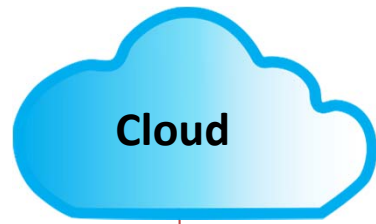


**If the device is developed under oneM2M, openMTC, or AllJoyn, these IoT platforms will provide APIs for the user to develop network application for the device.**

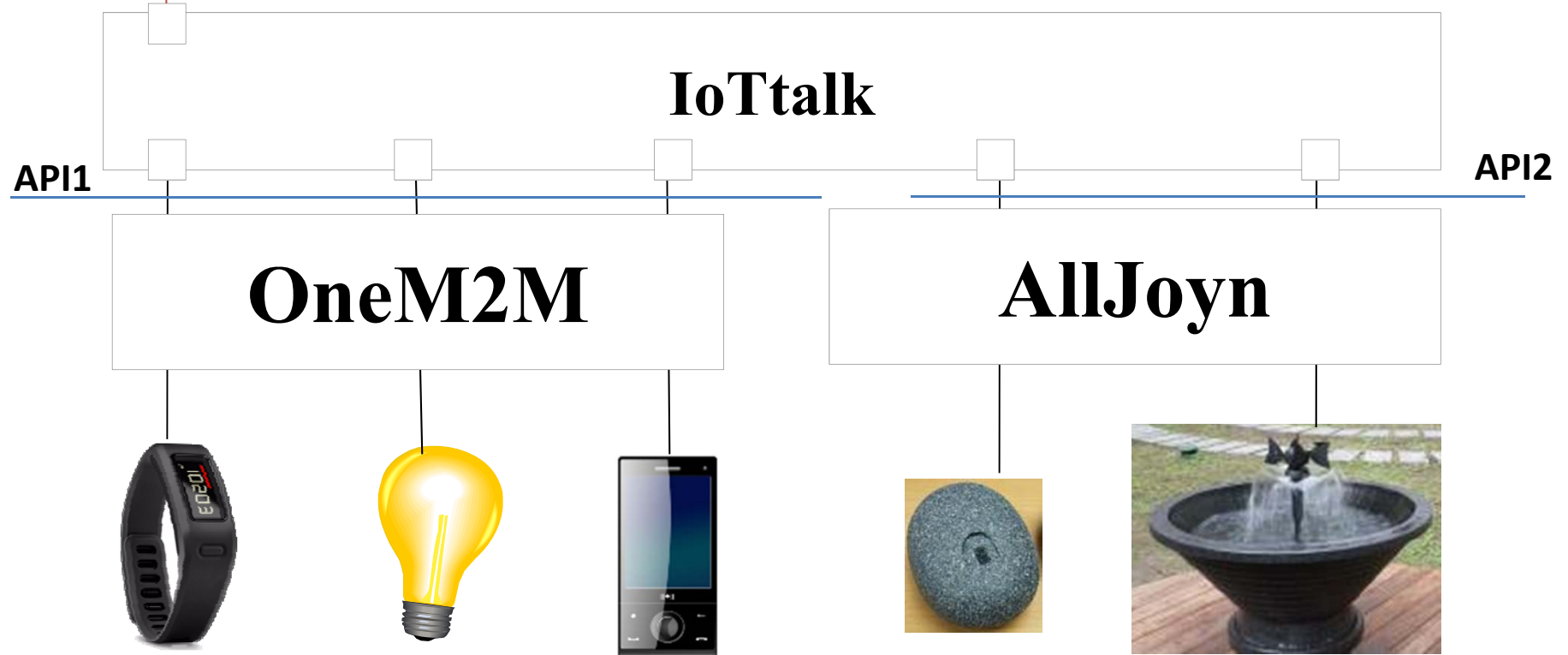


**These standards are difficult to interoperate, and the devices cannot easily communicate**



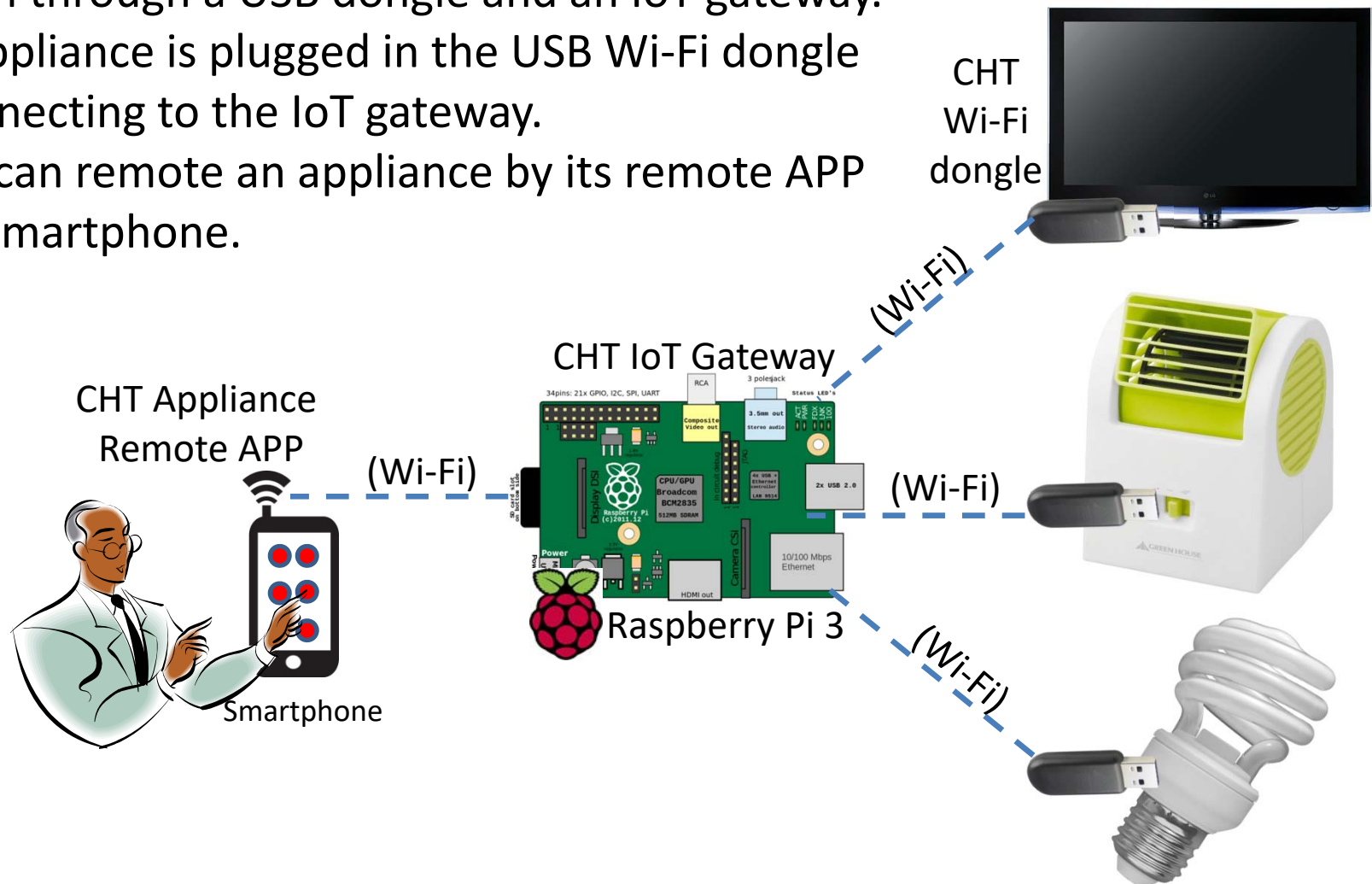


**IoTtalk is a network application platform built on top of the above IoT systems to simplify the network application development.**

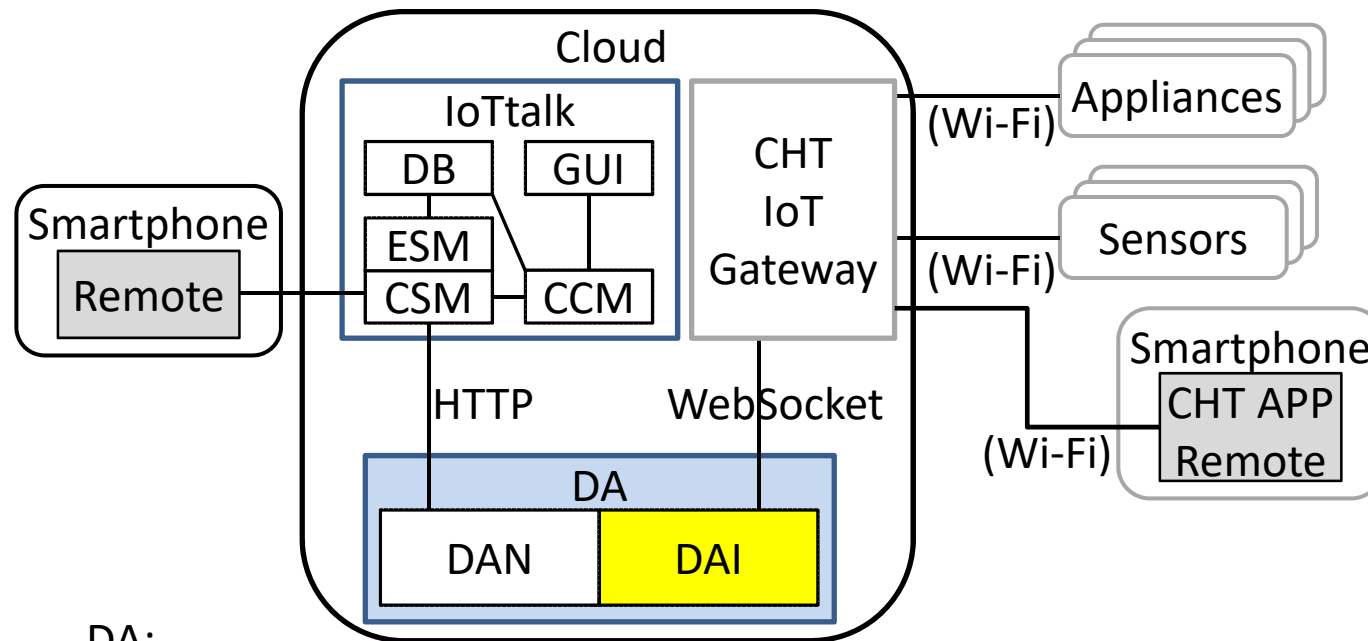


# The Smart Home Solution by CHT

- Chunghwa Telecom (CHT) provides a smart home solution through a USB dongle and an IoT gateway.
- Each appliance is plugged in the USB Wi-Fi dongle for connecting to the IoT gateway.
- A user can remote an appliance by its remote APP in the smartphone.



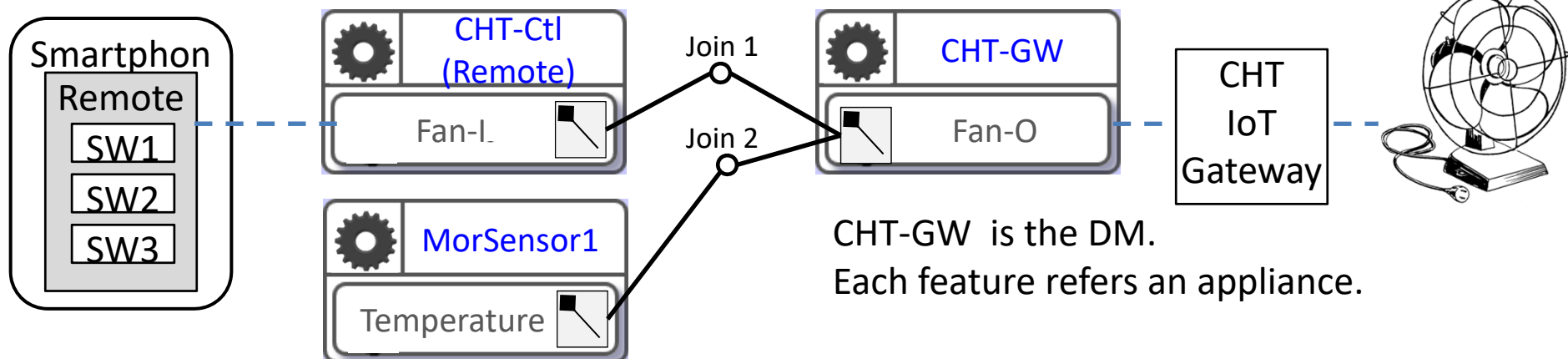
# CHT Smart Home with IoTtalk



DA:

1. *Register/Deregister* for appliances/sensors according to **notifications**
2. *Pull* **commands** from the IoTtalk server to CHT home server
3. Receive **sensor data** then *Push* them to the IoTtalk server

For example:



# Conclusion

- IoTtalk is an IoT device management tool
- Easy to deploy and operate
- Easy to develop applications - simply connect IDFs and ODFs
- Transparently observe the connections between IoT devices
- Monitor the transmitting values between IoT devices
- Application debugging is more easier