SNS COLLEGE OF ENGINEERING

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An Autonomous Institution

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UNIT 2
IOT Reference Architecture and Technologies

Control Units

Control units in IoT

- An Electronic Control Unit (ECU) is a device,such as a sensor or an actuator, that is connected to other devices via a CAN Bus.
- The Internet of Things is rarely discussed without the conversation steering to data and the new data economy
- Sensors are the source of IoT data

Communication Modules

- IoT devices are found everywhere and will enable circulatory intelligence in the future. For operational perception, it is important and useful to understand how various IoT devices communicate with each other.
- Communication models used in IoT have great value. The IoT allow people and things to be connected any time, any space, with anything and anyone, using any network and any service.

Types of Communication Modules

- Bluetooth
- Zigbee
- Wifi

Bluetooth:

It is a serious technology used for IoT applications. Apart from being the ubiquitous solution for hands-free calling and wireless transmission technology for audio, Bluetooth technology is leading in consumer and business IoT

Zigbee

- Zigbee is a technological standard designed for control and sensor networks
- Zigbee is **a standards-based wireless technology developed to enable low-cost, low-power wireless machine-to-machine (M2M) and internet of things (IoT) networks**. Zigbee is for low-data rate, low-power applications and is an open standard.

Characteristics of zigbee

- Low cost
- Low power consumption
- Low data rate
- Scalability
- Reliability
- Flexible protocol

Wifi

- WiFi technology is a wireless technology that **allows devices access to the internet without the need for cables**
- Integration and interoperability delivered by Wi-Fi will enable IoT solutions to securely interconnect to one another and to billions of user-centric devices to unlock the greatest value from IoT applications and environments

GPS

- The functionality of an IoT GPS tracking device at a glance
- **The information is transmitted to a server via a wireless radio standard**: The satellite broadcasts its position and time using coded radio signals. A GPS tracker 2 uses this information to calculate its position and passes it on to a server 4 via radio 3.

IOT Protocols

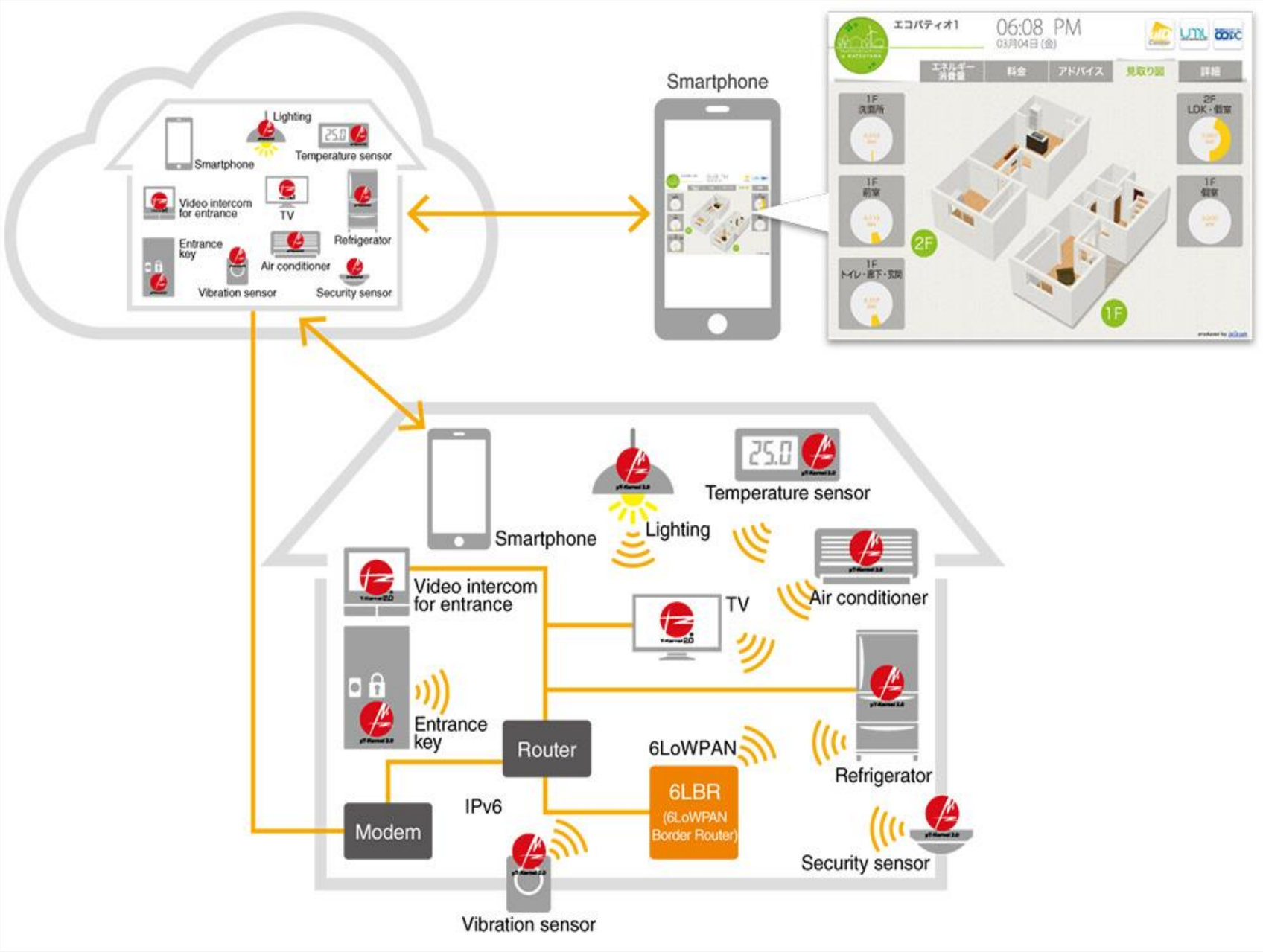
- Internet protocol (IP) is **a set of rules that dictates how data gets sent to the internet**. IoT protocols ensure that information from one device or sensor gets read and understood by another device, a gateway, a service.

IPV6

- Internet protocol version 6 (IPv6) is **a network layer protocol that allows communication to take place over the network**.
- IPv6 In IoT has a **highly efficient multicast communication feature that eliminates the requirement for routine broadcast messaging**. This improvement helps in preserving the battery life of IoT devices by reducing the number of packets processed. IPv6 provides multiple addresses to devices.

6LOWPAN

- 6LoWPAN is **the name of an Internet Engineering Task Force (IETF) standard that defines an approach for routing Internet Protocol version 6 (IPv6) over low-power wireless networks**.
- 6LoWPAN specification contains packet compression and other optimization mechanisms to enable the efficient transmission of IPv6 packets on a network with limited power resources and reliability, which makes efficient IPv6 communication over low-power wireless networks possible.


Smartphone
Lighting
Temperature sensor
Video intercom for entrance
TV
Refrigerator
Entrance key
Air conditioner
Vibration sensor
Security sensor
Router
6LoWPAN
6LBR
(6LoWPAN Border Router)
IPv6
Modem
2F
1F

RPL

- Routing Protocol for Low-Power and Lossy Networks (RPL) is **an IPv6 routing protocol that is standardized for the Internet of Things (IoT) by Internet-Engineering Task Force (IETF)**. RPL forms a tree-like topology which is based on different optimizing process called Objective Function (OF).
- RPL is a flexible and scalable routing protocol and using it as a standard **makes it easier to build an interoperable solution for any application making it a part of IoT**. There are many efforts to improve and create enhanced versions of RPL taking advantage of its flexible and scalable design.

MQTT

- Message queuing telemetry support (MQTT) is defined as **a low bandwidth consumption machine-to-machine protocol that helps IoT devices communicate with each other, with minimal code requirements and network footprint**. MQTT stands for message queuing telemetry transport.

THANK YOU