IoT (Internet of Things)
Education Kit

Where is IOT?

- Smart Home – security, light, energy, wellbeing, household appliances
- Smart Energy – power grids, etc.
- Smart Health – wearable devices
- Smart manufacturing – asset management, operations improvement, maintenance, etc.
- Smart City – light, traffic, parking, environment, water, sewage, etc.
- Smart farming
- Autonomous vehicles

Smart World

Air Pollution
Control of CO_2 emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection
Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing
Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care
Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care
Vital signs monitoring in high performance centers and fields.

Structural Health
Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Smartphones Detection
Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

Perimeter Access Control
Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels
Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels
Measurement of the energy radiated by cell stations and and WiFi routers.

Traffic Congestion
Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Smart Roads
Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting
Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping
Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Noise Urban Maps
Sound monitoring in bar areas and centric zones in real time.

Water Leakages
Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis
Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location
Search of individual items in big surfaces like warehouses or harbours.

Waste Management
Detection of rubbish levels in containers to optimize the trash collection routes.
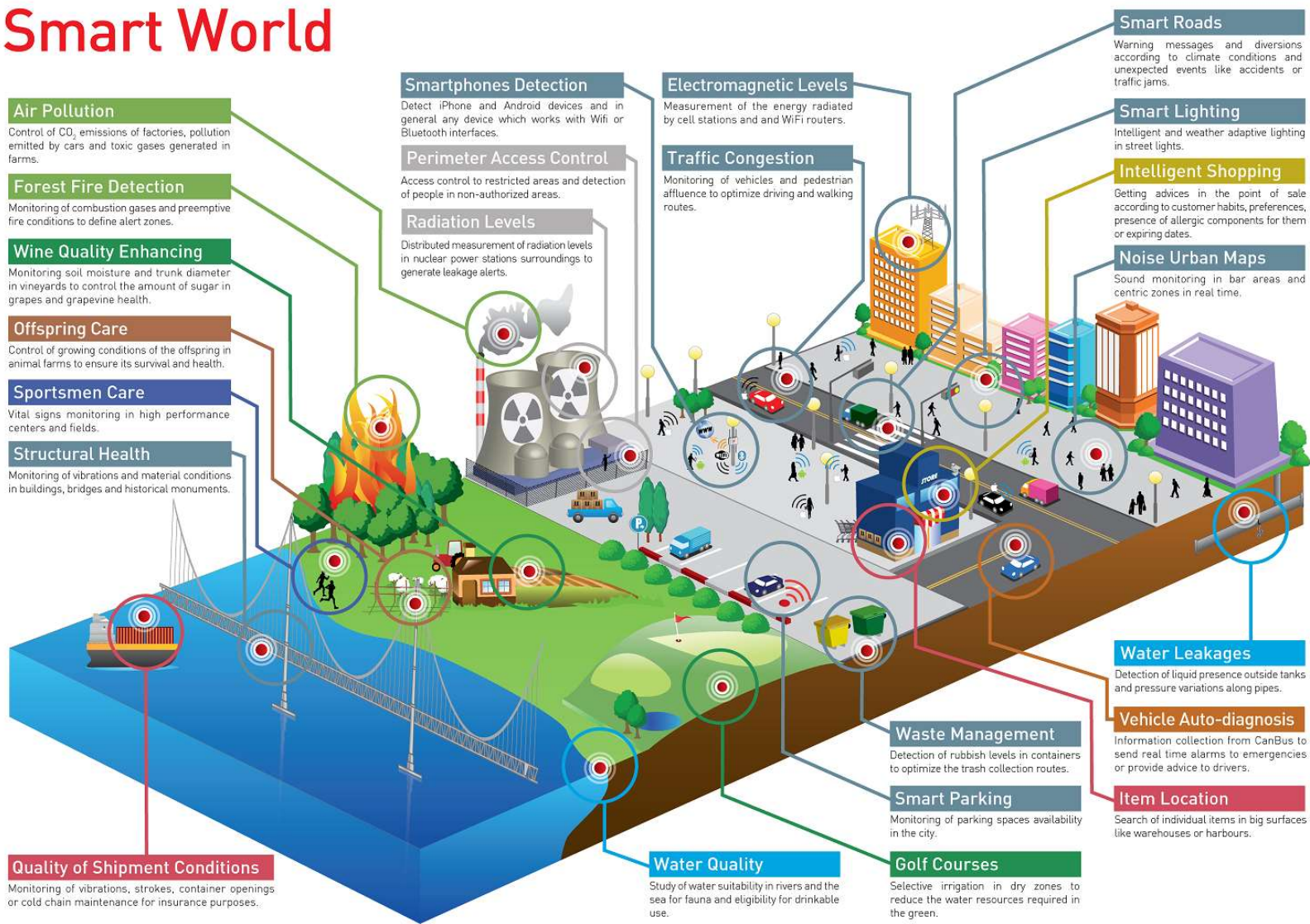
Smart Parking
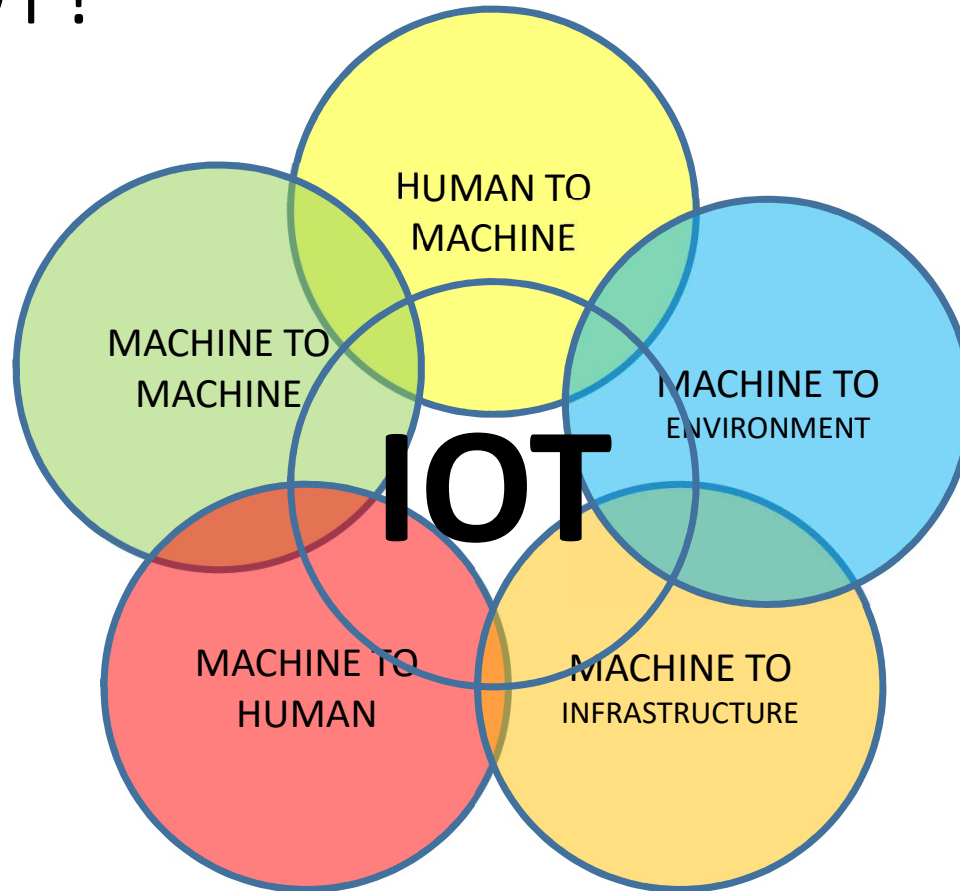Monitoring of parking spaces availability in the city.

Quality of Shipment Conditions
Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Water Quality
Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.

Golf Courses
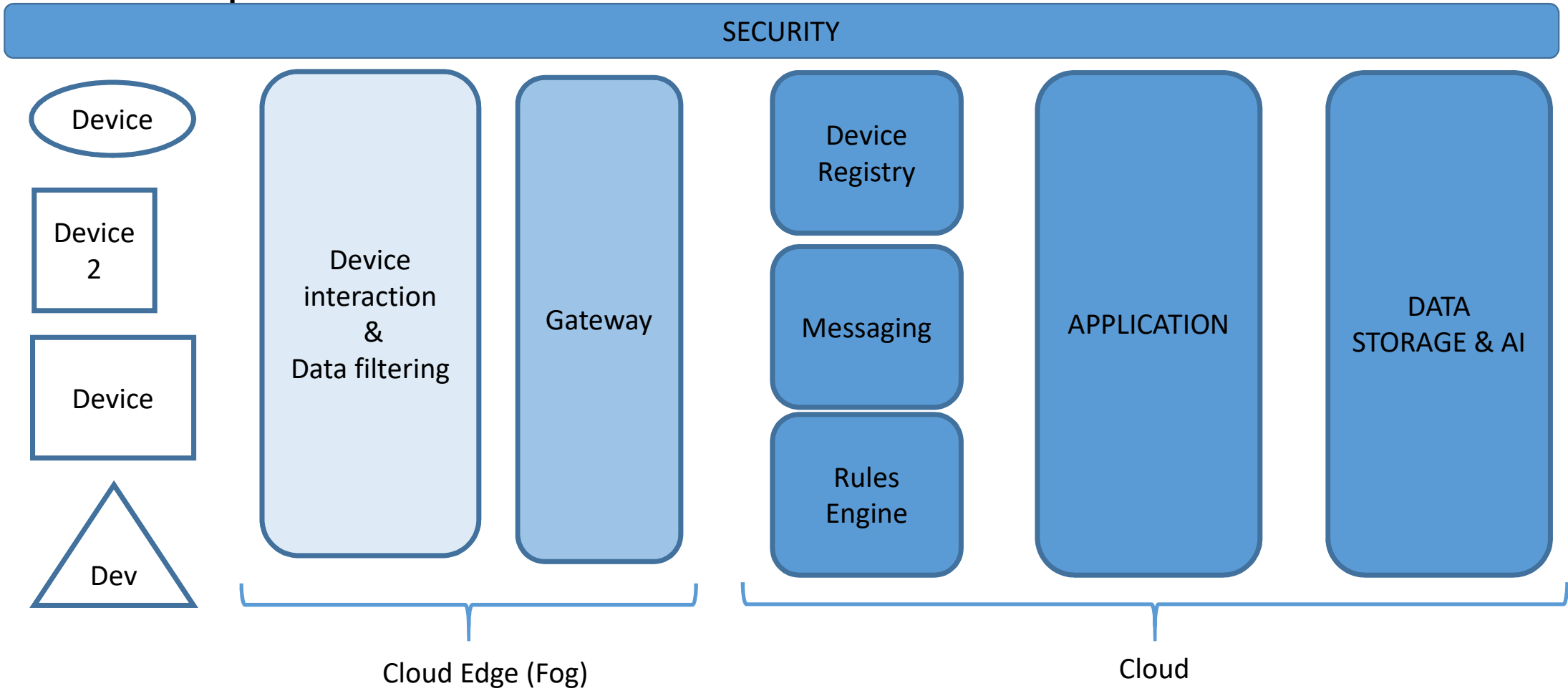Selective irrigation in dry zones to reduce the water resources required in the green.

What is IOT?

HUMAN TO MACHINE

MACHINE TO MACHINE

MACHINE TO ENVIRONMENT

IOT

MACHINE TO HUMAN

MACHINE TO INFRASTRUCTURE

How IOT?

Unlimited data & computing recourses

Cloud

Communication Gateways

Edge Cloud (Fog)

Low resources computing

Devices (sensors & actuators)

Human (interaction & control)

Deeper ?

SECURITY

Device

Device 2

Device

Dev

Device interaction & Data filtering

Gateway

Device Registry

Messaging

Rules Engine

APPLICATION

DATA STORAGE & AI

Cloud Edge (Fog)

Cloud

Standards

Source: AIOTI WG3 (IoT Standardisation) – Release 2.6

What Is White-Cube?

White-Cube is a software-enabled IoT platform

aiming to provide software developers

hassle-free remote control over

various types of IoT devices

What Is White-Cube?

- Multiple Sensors: Temp, Reed (IR), Noise, Light, Humidity and others
- Multiple Controllers: Button, Led, Relay
- Seamless setup
- Simple software interface
- Run it from anywhere
- Made easy for software developers

What Can I Accomplish With It?

- Build your own logic to control your environment:
  - Room access control
  - Smart irrigation system
  - Lecture attendance counter

- Control it with any programming language: C, C++, Closure, Dart, Delphi, Erlang, Go, Haskell, Java, Javascript, .Net, Objective-C, Perl, Php, Python, Ruby
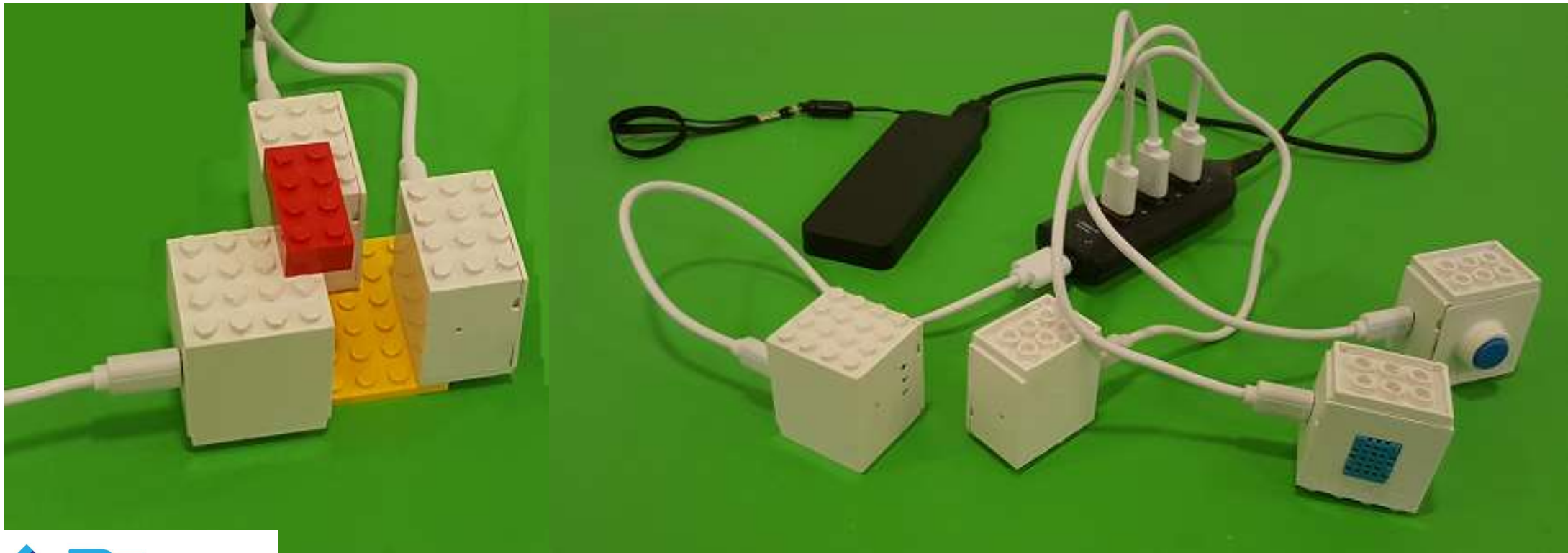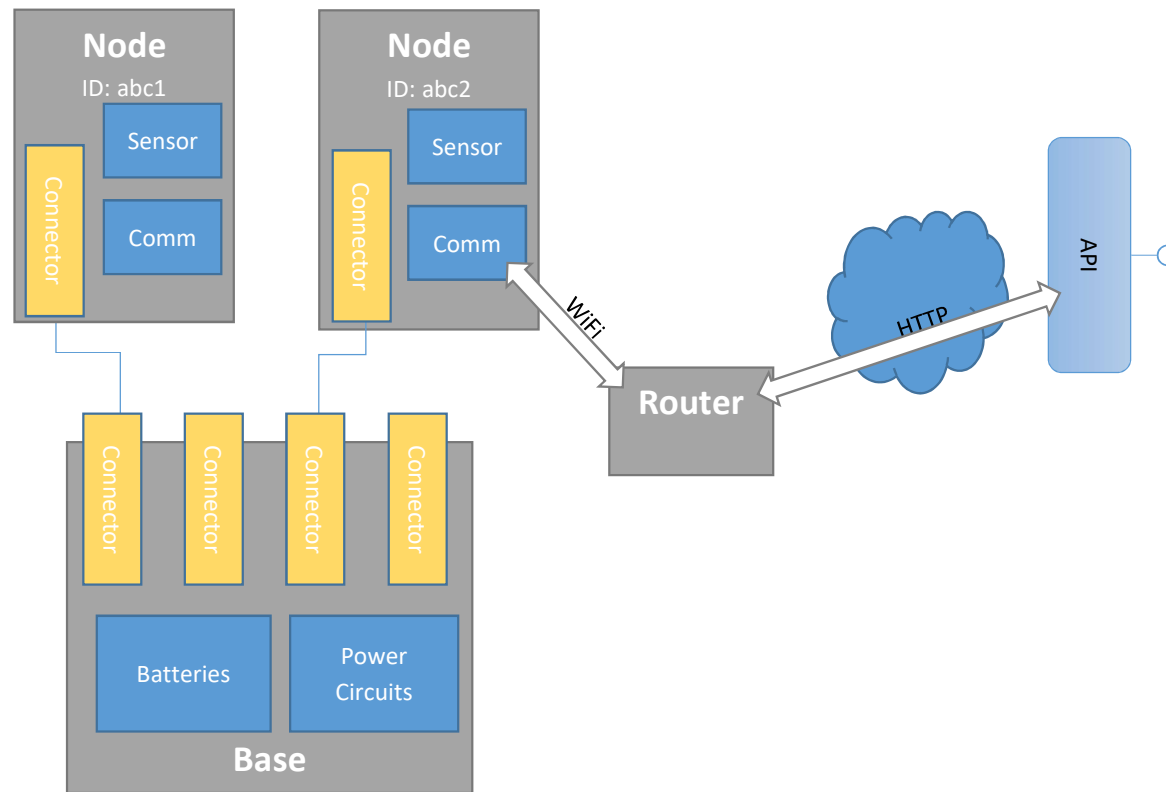
How to teach?

Simplify

&

PLAY

3π SOLUTIONS

White-Cube sensors and actuators – a game to study

Block diagram

IOT System based on White-Cube Kit

Thank you

Mr. Alexander Shmunik

CEO 3pi-solutions

www.3pi-solutions.com

Dr. Yakov Damatov

Computer Science Faculty

www.hit.ac.il

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- And many others