A platform to build smart solutions for everyday ease

The Internet of Things (IoT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring Human-to-Human or Human-to-Computer interaction. IoT has evolved from the convergence of Wireless Technologies, Micro-ElectroMechanical Systems (MEMS) and the Internet. IoT is more than smart homes and connected appliances. IoT is about connecting devices over the Internet, letting them talk to us, applications, and each other. Essentially, it is an overarching platform that allows a variety of devices or machines to communicate with each other by "Machine to Machine" communication (M2M)
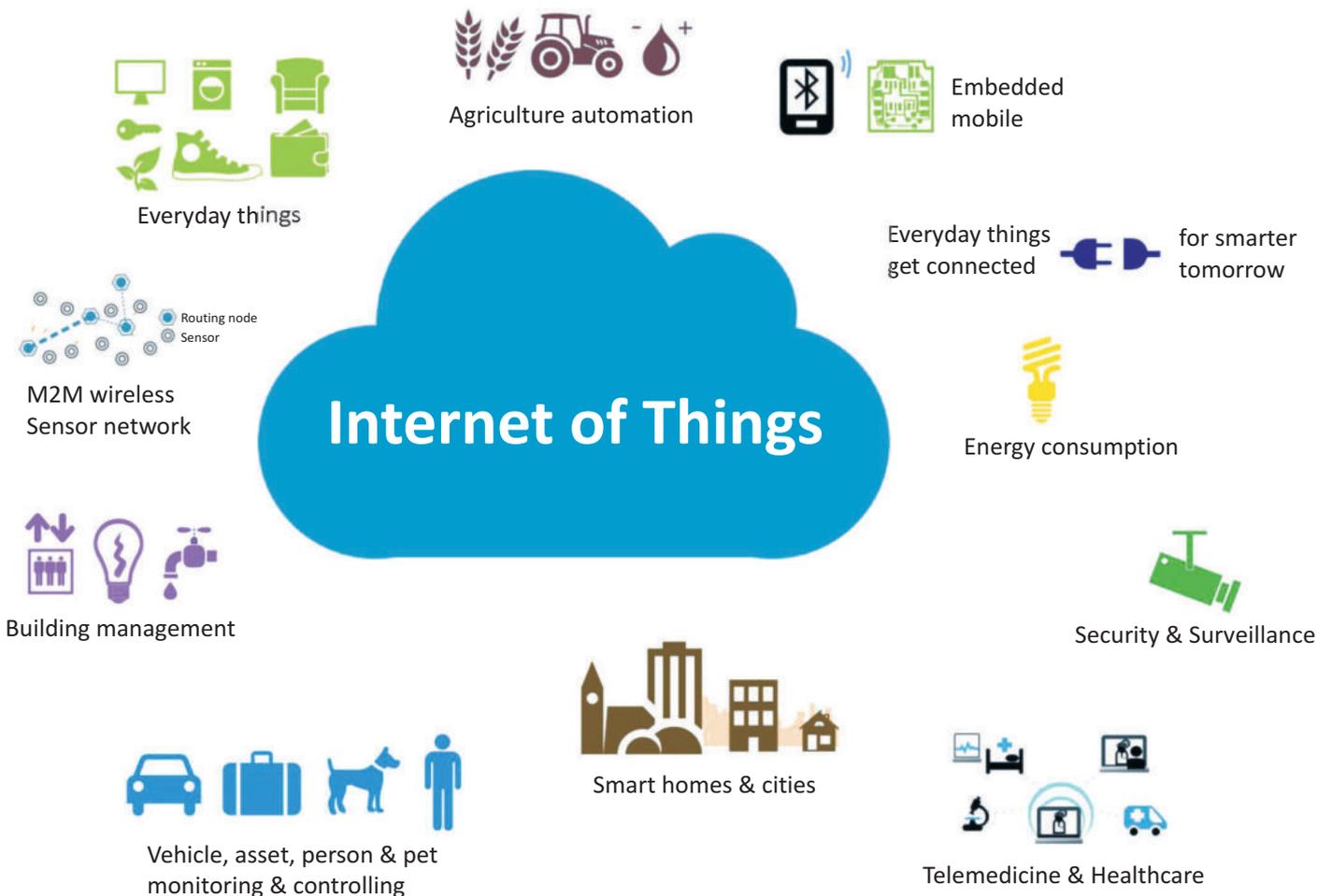
Scientech IoT Builder is a unique solution which allows user to explore Architecture, Working, and Applications of Internet of Things. The Internet of Things (IoT) is the network of physical objects or "Things" embedded with electronics, software, Sensors, and network connectivity, which enable these objects to collect and exchange data.

Features

- In-depth practical learning on IoT
- In-depth practical learning on WSN
- Linux based design
- Linux Operating System porting
- Linux python programming
- Qt IDE based GUI development
- Study of Sensor and Actuator interfacing
- Local cloud & server configuration
- Over the air (OTA) sensor node configuration
- GUI based parameter configuration
- GUI Base IoT application development
- IoT Gateway Using WiFi and Ethernet
- Bluetooth and Zigbee interface
- HDMI interface for display
- USB HID and CDC interface

- Ethernet interface
- 4 channel ADC for Voltage input
- Input for Resistance measurement
- Input for 4-20mA measurement
- RS485, I2C, SPI Protocol interface
- LEDs interface
- Motor driver interface
- Color TFT display
- Serial to USB converter
- microSD card socket
- Office Suite
- Switches interface
- Camera connectivity
- GPIO Connectors for external module interface
- GSM IoT gateway (optional)

Applications

Everyday things

Agriculture automation

Embedded mobile

Everyday things get connected — for smarter tomorrow

M2M wireless Sensor network

Routing node
Sensor

Internet of Things

Energy consumption

Building management

Security & Surveillance

Smart homes & cities

Vehicle, asset, person & pet monitoring & controlling

Telemedicine & Healthcare

Complete setup of Scientech 6205L

Scope of Learning

Introduction to Internet of Things (IoT)
- Definition of the Internet of Things (IoT)
- The Importance of the Internet of Things (IoT)
- IoT Architecture
- History of IoT, M2M and Web of Things
- Overview of IoT Builder Hardware platforms
- The Layering concepts, IoT Communication Pattern, IoT protocol Architecture
- Understand IoT Market perspective in different segments.

Operating System used for IoT
- Linux Operating System introduction
- Working with the command line and the Shell
- Managing directories and files
- Managing user access and security
- Setting up a Linux file system
- Connecting a system to the network

Shell Scripting Programming for IoT
- Introduction
- Creating Shell Scripts
- Flow control in the Shell
- Advanced Shell features

Programming Language used in IoT
- C Programming
- Python

Hardware Interfacing for IoT
- Sensors interfacing
- Actuators interfacing

Communication Protocol study for IoT
- UART Communication
- RS485 Communication
- I2C and SPI Protocol device interfacing
- Ethernet configuration
- Zigbee interfacing
- MQTT Protocol
- Wi-Fi AP and Router interfacing
- GSM module interfacing (optional)

Database, Cloud Configuration for IoT

Qt based GUI and C++ Programming for IoT

Web and Application Development Tools for IoT

Color recognition using USB camera and openCV (optional)

Importance of Wireless Sensor Network (WSN) in IoT

Case study & advanced IoT Applications with :
- Smart Agriculture Sensors
- Smart Environment Sensors
- Smart Industrial Sensors
- Smart Water Sensors
- Smart Home Automation
- Smart Security Solutions

Technical Specifications

Processor	:	64bit cortex A53 ARMv8 Quad Core Processor 1.4GHz
Connectivity	:	802.11 b/g/n Wireless LAN Bluetooth 4.1, zigbee, USB & Ethernet
RAM	:	1GB LPDD2
Memory	:	32GB
OS	:	Linux
Ethernet	:	10/100 BaseT Ethernet socket
Video Output	:	HDMI and Composite RCA
Audio Output	:	Audio Output 3.5mm jack
USB	:	4 nos.
Camera	:	15-pin MIPI Camera Serial Interface
Memory Card	:	Push/pull Micro
LCD	:	Color TFT LCD
Motor Driver	:	Stepper and DC Motor
Analog Input	:	8 nos.
Relay Output	:	4 nos.
Buzzer Output	:	1 no.
Zigbee Frequency	:	2.4GHz
Power	:	5V, 2A

Wireless Sensor Node

Analog Inputs	:	6 nos.
Digital Outputs	:	4 nos.
I2C channel	:	1 no.
Communication	:	Zigbee 2.4 GHz
PC Interface	:	USB
Charging	:	USB and Solar Panel
Battery	:	3.7V/4400mAH
Solar Panel	:	6W

Included Sensors with Scientech 6205L

SS150 Temperature and Humidity : 2 nos.
SS151 Air Quality Sensor : 2 nos.
SS152 Soil Moisture : 2 nos.
SS153 Ambient Light Sensor : 2 nos.
SS154 Soil/Water temperature : 2 nos.
SS155 PIR Sensor : 2 nos.

TREES FOR THE FUTURE

Scientech Will Plant A Tree For Every Product Sold

For more information please visit : **www.sefworld.org**

Optional

GSM IoT Gateway

- Quad-Band 850/900/1800/1900 MHz
- GPRS multi-slot class 10/8
- GPRS mobile station class B
- Compliant to GSM phase 2/2+
- Class 4 (2 W @850/ 900 MHz)
- Class 1 (1 W @ 1800/1900MHz)
- Control via AT commands
- SIM application toolkit
- Supply voltage range : 3.2 ... 4.8V
- GPRS class 10 : max. 85.6 kbps (downlink)
- Embedded TCP/UDP protocol

Optional Cloud:

Online Cloud/Server

This is online server, in this user will get one static IP address, one domain (Website) name and one database along with email address. Annual subscription for domain name and IP address required.

Ordering Information

S.No.	Product Name	Model No.
1.	IoT Builder - Lemon	Scientech 6205L
2.	IoT Builder – Orange	Scientech 6205O
3.	IoT Builder - Watermelon	Scientech 6205W
4.	Extra Wireless Sensor Node	Scientech 6205N
5.	GSM IoT Gateway	Scientech 6205G
6.	Industrial Sensor Gateway	Scientech 6205ISG
7.	Industrial Wireless Sensor Node	Scientech 6205IN
8.	Online Cloud/Server	Scientech 6205C

Important Note:

- To perform actual/remote cloud application and configuration user must have Static IP based server with MySQL Database/Php/Java/Html software.

- The best feature of Scientech IoT Builder – Development Platform is that users can configure it as a Base Station for WSN, IoT gateway and Cloud Storage. So if users want to configure it as gateway and Cloud separately (in case Static Server IP is not available) then they will require 2nos. of IoT Builder – Development Platforms.

- To make IoT Builder– Development Platform as a GSM gateway users must have own SIM Card with data balance.

- Product customization is also possible for Industrial requirement.

Scientech IoT Builder Setups

	Features	IoT Builder Lemon	IoT Builder Orange	IoT Builder Watermelon
A	**IoT Builder-Development Platform**			
	4 Channel ADC for Voltage Input	Yes	Yes	Yes
	1 Channel For Resistance Input	Yes	Yes	Yes
	1 Channel For 4-20mA Input	Yes	Yes	Yes
	8 Nos. LED	Yes	Yes	Yes
	TFT Color LCD	Yes	Yes	Yes
	GSM Modem (SIM Not Included)	Optional	Yes	Yes
	Motor Driver Circuit	Yes	Yes	Yes
	Serial to USB Converter	Yes	Yes	Yes
	WiFi Connectivity for IoT Gateway	Yes	Yes	Yes
	Ethernet Connectivity for IoT Gateway	Yes	Yes	Yes
	Bluetooth Connectivity	Yes	Yes	Yes
	I2C Interface	Yes	Yes	Yes
	SPI Interface	Yes	Yes	Yes
	RS485 Interface	Yes	Yes	Yes
	DC Motor	1	1	1
	On board Zigbee Coordinator	1	1	1
B	**Wireless Sensor Node (End/Router Device)**	2 nos	5 nos	10 nos
	Analog Input	8 nos	20 nos	40 nos
	Digital Input	4	10	20
	I2C Communication	2	2	2
	IP65 Box	Yes	Yes	Yes
	IP65 Connectors	Optional	Optional	Yes
	Solar Panel for Charging	2 nos	5 nos	10 nos

C	Included Sensors & Actuator (with each device)			
	SS150 Temperature & Humidity	2 nos	5 nos	10 nos
	SS151 Air Quality Sensor	2 nos	2 nos	2 nos
	SS152 Soil Moisture	2 nos	3 nos	3 nos
	SS153 Ambient Light Sensor	2 nos	2 nos	3 nos
	SS154 Soil/Water temperature	2 nos	3 nos	4 nos
	SS155 PIR Sensor	2 nos	2 nos	3 nos
	SS156 Leaf wetness	Optional	2 nos	3 nos
	SS157 Industrial Soil Moisture	Optional	Optional	2 nos
	SS158 Water Conductivity	Optional	Optional	1 no
	SS159 Alcohol Sensor	Optional	Optional	2 nos
	SS160 Dust Sensor	Optional	1 no	2 nos
	SS161 Anemometer + wind vane +pluviometer	Optional	Optional	1 no
	Relay Board	1 no	1 no	1 no
	Buzzer Board	1 no	1 no	1 no
D	**Essential items**			
	HDMI or VGA Monitor	Optional	Optional	1 no
	USB Mouse	1 no	1 no	1 no
	USB Keyboard	1 no	1 no	1 no
	USB HUB	Optional	1 no	1 no
	HDMI to VGA Converter	1 no	1 no	Not Required
E	**Other items**			
	Bluetooth Kit	Optional	Optional	1 no
	Camera Module	1 no	1 no	1 no
	RS485 Kit	Optional	Optional	1 no

Subject to Change