

IoT Builder

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)

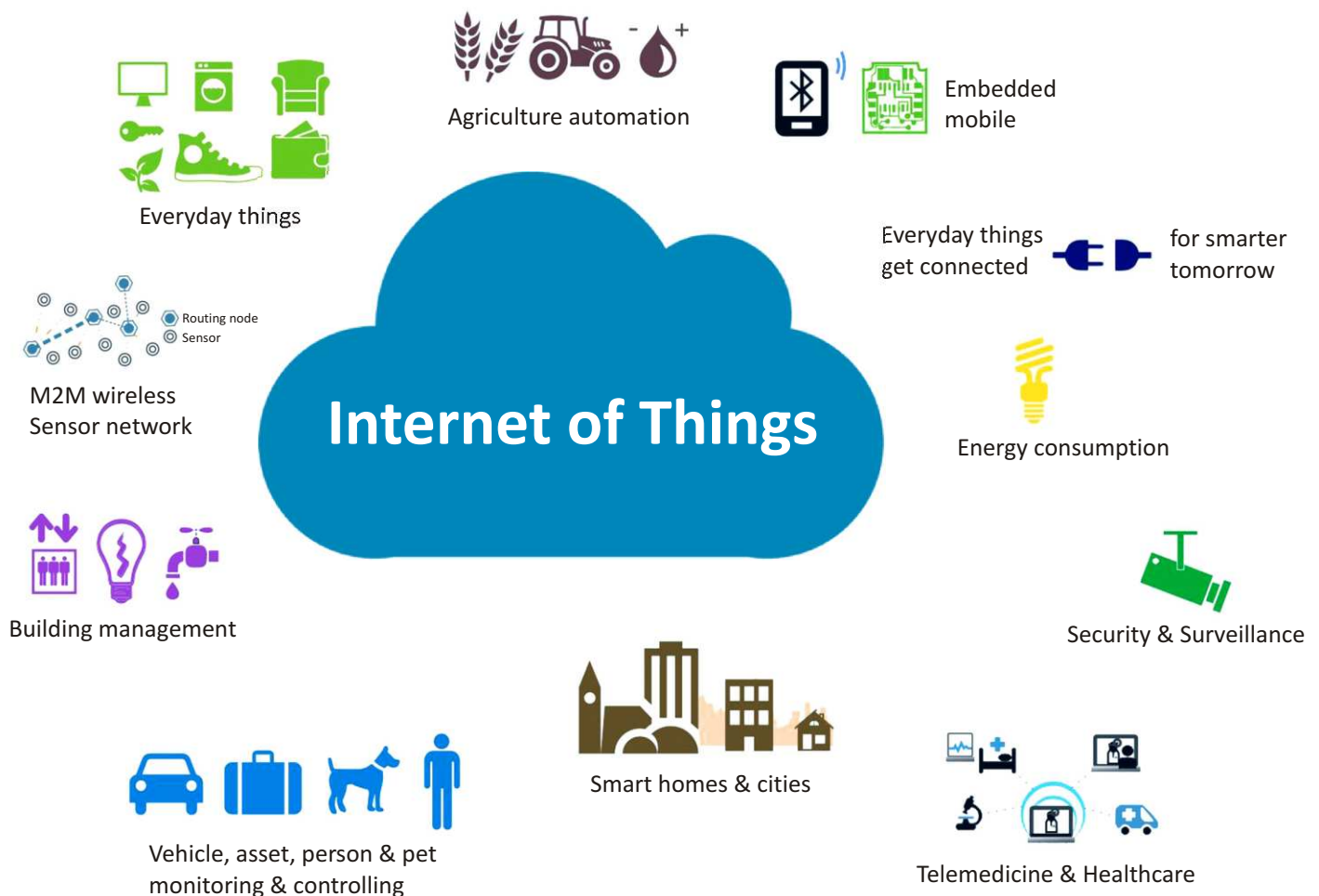
Sciencetech IoT Builder is a unique solution which allows user to explore Architecture, Working, and Applications of Internet of Things. The Internet of Things (IoT) is the network of physical objects or "Things" embedded with electronics, software, Sensors, and network connectivity, which enable these objects to collect and exchange data.

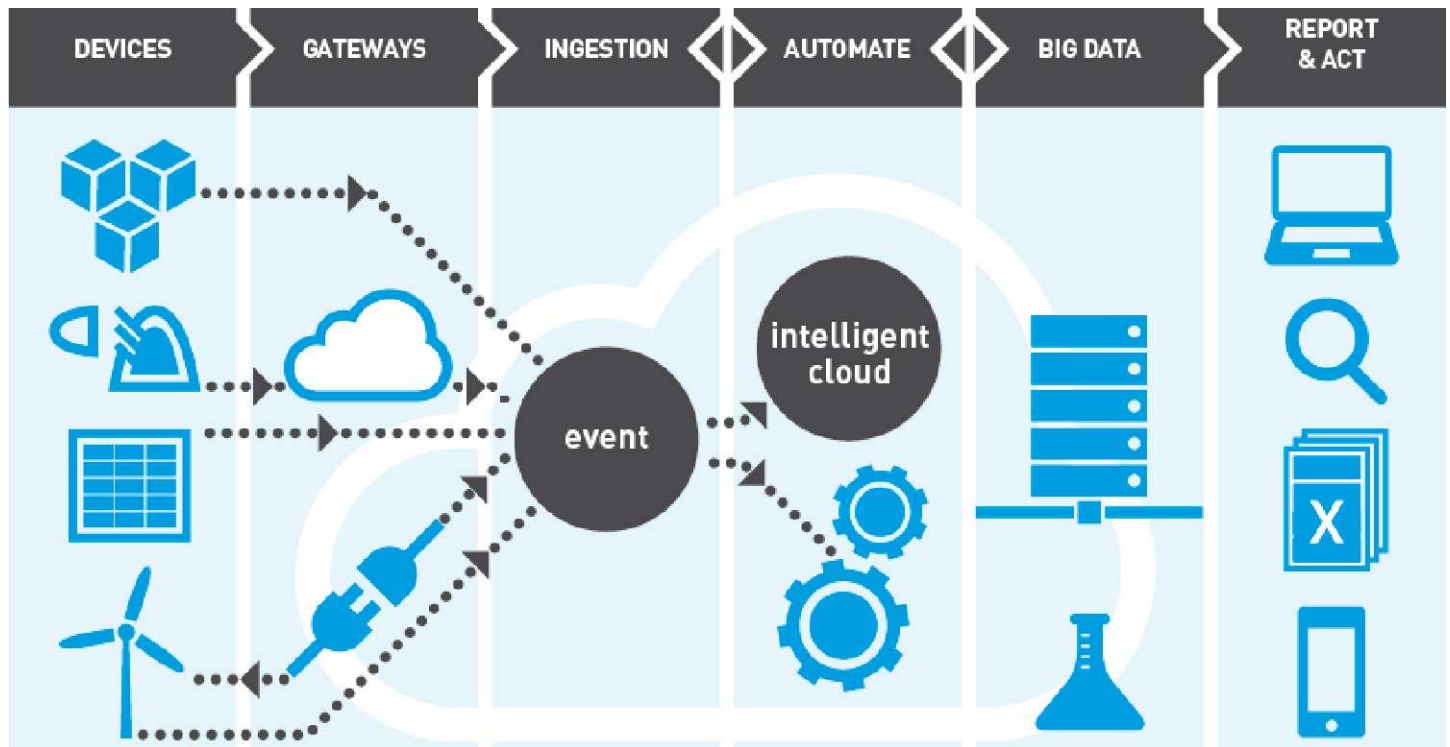


Features

- 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) node configuration
- GUI based parameter configuration
- GUI Base IoT application development
- IoT Gateway Using WiFi and Ethernet
- Bluetooth interface
- 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 Suit
- Switches interface
- Audio interface
- Connectors for external module interface
- Camera connectivity
- GSM IoT gateway (optional)

Applications





Scope of Learning

Introduction to Internet of Things (IoT)

- Definition of the Internet of Things (IoT)
- The Importance of the Internet of Things (IoT) in Society
- IoT Architecture
- History of IoT, M2M Machine to Machine, Web of Things
- Overview of IoTLab Hardware platforms
- The Layering concepts, IoT Communication Pattern, IoT protocol Architecture, 6LoWPAN
- 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
- Understanding system initialization
- Connecting a system to the network
- Installing and Configuring Linux

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 Protocol device interfacing
- SPI Protocol device interfacing
- Ethernet configuration
- Zigbee interfacing
- Wi-Fi AP and Router interfacing
- GSM module interfacing (optional)

Database, Cloud and Server Configuration for IoT

Qt based GUI and C++ Programming for IoT

Web and Application Development Tools for IoT

Importance of Wireless Sensor Network (WSN) in IoT

Study of Zigbee router, end device and coordinator configuration

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 ARMv7 Quad Core Processor 1.2GHz
Connectivity	: 802.11 b/g/n Wireless LAN Bluetooth 4.1, zigbee, USB & Ethernet
RAM	: 1GB
Memory	: 16GB (upgradable)
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

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.



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/Server:

Physical Cloud/Server

It included physical hardware (Computer) for Sever along with all required software. Also it will come with static IP address. Annual subscription is required for only IP Address. In this internet facility should be required in user's premises.

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 Gateway	Scientech 6205I
7.	Industrial Wireless Sensor Node	Scientech 6205IN
8.	Physical Cloud/Server	Scientech 6205P
9.	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.

Sciencetech 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	Optional	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
	Stepper 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	No	No	Yes
	Solar Panel for Charging	Yes	Yes	Yes

C	Included Sensors & Actuator (with each device)			
	SS150 Temperature & Humidity	Yes	Yes	Yes
	SS151 Air Quality Sensor	Yes	Yes	Yes
	SS152 Soil Moisture	Yes	Yes	Yes
	SS153 Ambient Light Sensor	Yes	Yes	Yes
	SS154 Soil/Water temperature	Yes	Yes	Yes
	SS155 PIR Sensor	Yes	Yes	Yes
	SS156 Leaf wetness	No	Yes	Yes
	SS157 Watermark Soil Moisture	No	No	Yes
	SS158 Water Conductivity	No	No	Yes
	SS159 Alcohol Sensor	No	No	Yes
	SS160 Dust Sensor	No	Yes	Yes
	SS161 Anemometer + wind vane +pluviometer	No	No	Yes
	Relay Board	Yes	Yes	Yes
	Buzzer Board	Yes	Yes	Yes
D	Essential items			
	HDMI or VGA Monitor	No	No	Yes
	USB Mouse	Yes	Yes	Yes
	USB Keyboard	Yes	Yes	Yes
	USB HUB	No	Yes	Yes
	HDMI to VGA Converter	Yes	Yes	No
E	Other items			
	Bluetooth Kit	Optional	Yes	Yes
	Camera Module	Optional	Yes	Yes
	RS485 Kit	Optional	Yes	Yes
	Android Tablet	Optional	Optional	Yes
F	Cloud Server			
	Static IP	Optional	Optional	Yes

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