In this we have used ThingSpeak Software as data sharing platform for our smart water management IOT project.

ThingSpeak:

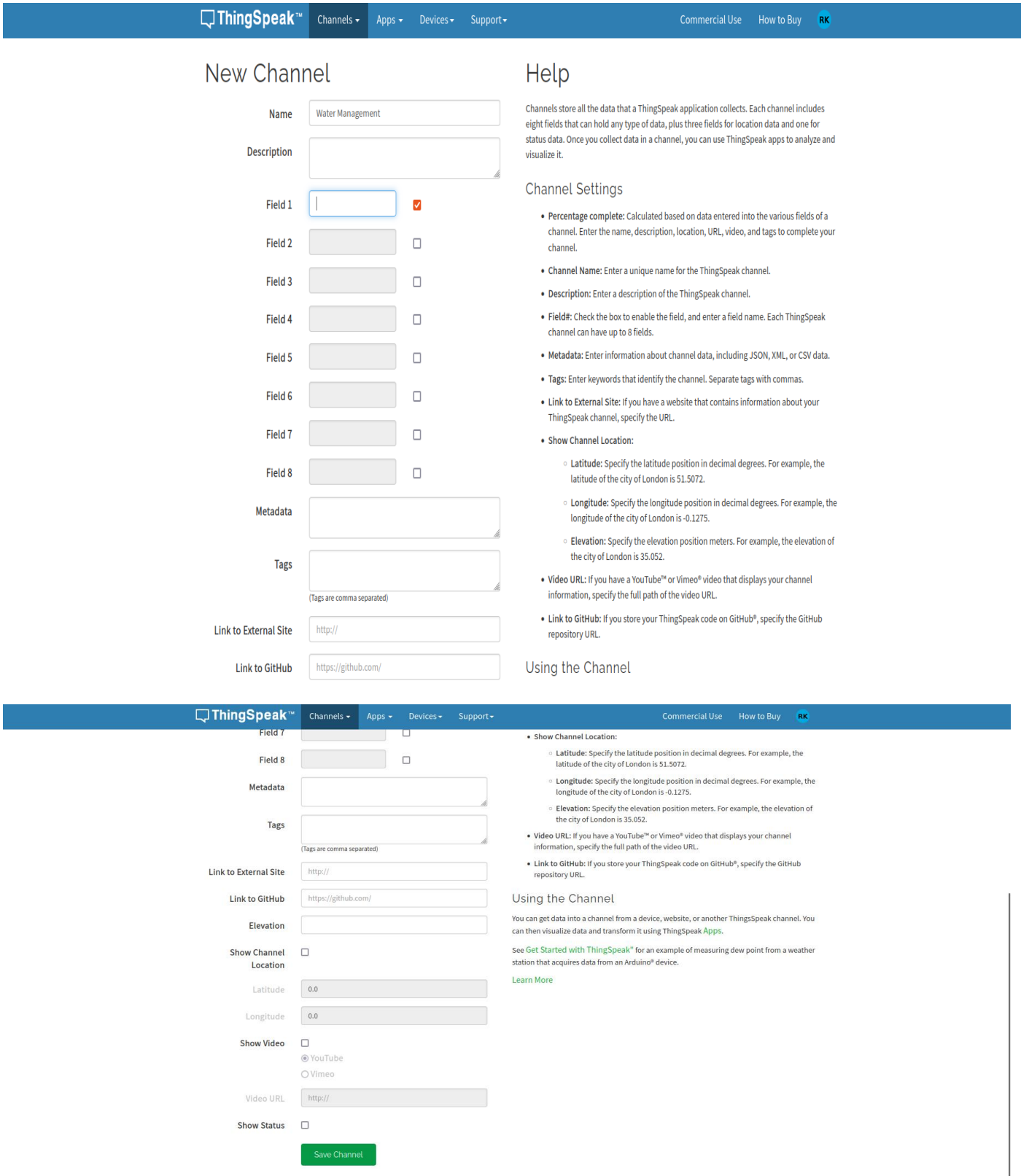
ThingSpeak is an IoT analytics platform service that allows you to collect, store, analyse, visualize, and act on data from sensors or other devices.

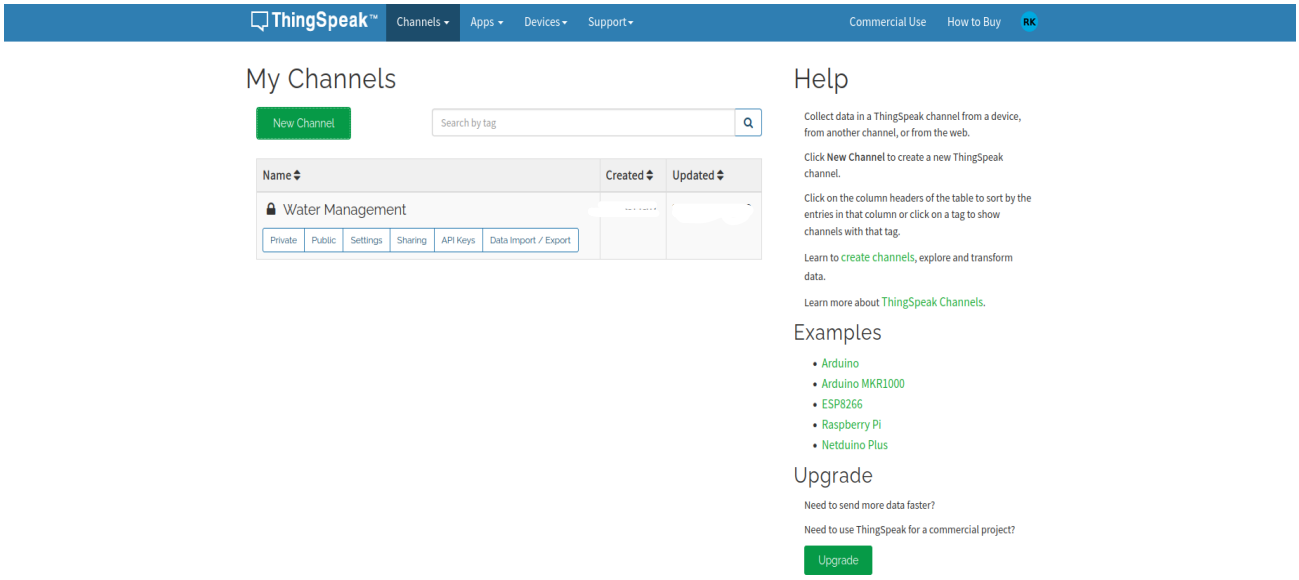
Key Features:

- Real-time data collection.
- Ability to store and retrieve historical data.
- Integration with MATLAB for advanced analytics.
- Support for MQTT and REST APIs for data exchange.

Account Creation: Start by creating a ThingSpeak account on the official website.

Create a Channel: In ThingSpeak, data is organized into channels. Create a new channel for each type of data you want to collect.


ThingSpeak™
Channels
Apps
Devices
Support
Commercial Use
How to Buy
RK
New Channel
Name
Water Management
Description
Field 1
Field 2
Field 3
Field 4
Field 5
Field 6
Field 7
Field 8
Metadata
Tags
(Tags are comma separated)
Link to External Site
http://
Link to GitHub
https://github.com/
Elevation
Show Channel Location
Latitude
0.0
Longitude
0.0
Show Video
YouTube
Vimeo
Video URL
http://
Show Status
Save Channel
Help
Channels store all the data that a ThingSpeak application collects. Each channel includes eight fields that can hold any type of data, plus three fields for location data and one for status data. Once you collect data in a channel, you can use ThingSpeak apps to analyze and visualize it.
Channel Settings
Percentage complete: Calculated based on data entered into the various fields of a channel. Enter the name, description, location, URL, video, and tags to complete your channel.
Channel Name: Enter a unique name for the ThingSpeak channel.
Description: Enter a description of the ThingSpeak channel.
Field#: Check the box to enable the field, and enter a field name. Each ThingSpeak channel can have up to 8 fields.
Metadata: Enter information about channel data, including JSON, XML, or CSV data.
Tags: Enter keywords that identify the channel. Separate tags with commas.
Link to External Site: If you have a website that contains information about your ThingSpeak channel, specify the URL.
Show Channel Location:
Latitude: Specify the latitude position in decimal degrees. For example, the latitude of the city of London is 51.5072.
Longitude: Specify the longitude position in decimal degrees. For example, the longitude of the city of London is -0.1275.
Elevation: Specify the elevation position meters. For example, the elevation of the city of London is 35.052.
Video URL: If you have a YouTube™ or Vimeo® video that displays your channel information, specify the full path of the video URL.
Link to GitHub: If you store your ThingSpeak code on GitHub®, specify the GitHub repository URL.
Using the Channel
You can get data into a channel from a device, website, or another ThingsSpeak channel. You can then visualize data and transform it using ThingSpeak Apps.
See Get Started with ThingSpeak™ for an example of measuring dew point from a weather station that acquires data from an Arduino® device.
Learn More



Setting Up IoT Devices:

1)Choose Your Platform: ThingSpeak is compatible with a variety of IoT platforms such as Arduino, Raspberry Pi, ESP8266, and others.

2)Install Libraries: Depending on your IoT platform, install the necessary libraries to enable communication with ThingSpeak.

Sending Data to ThingSpeak:

1)Generate API Keys: Create API keys for your ThingSpeak account to authorize your devices.

2)Configure IoT Devices: Set up your devices to send data to ThingSpeak using the provided API keys.

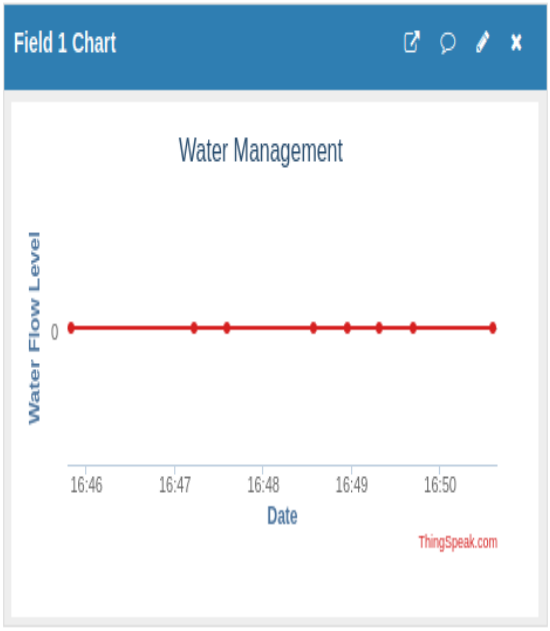
3)Use REST API or MQTT: ThingSpeak supports both RESTful API and MQTT for data communication.

Visualizing Data:

1)Channel Views: ThingSpeak provides customizable channel views where you can see your data in tabular or graphical formats.

2)MATLAB Visualizations: Advanced users can leverage MATLAB Visualizations for more sophisticated data analysis and plotting.

Entries: 8



Code used for ThingSpeak in WOKWI:

Program:

```
#include <Wire.h>
#include <Adafruit_Sensor.h>
#include <Adafruit_BME280.h>
#include <WiFi.h>
#include <NewPing.h>
#include <ThingSpeak.h>
// ThingSpeak settings
const char *ssid = "Wokwi-GUEST";
const char *password = "";
const char *thingSpeakApiKey = "YourAPIkey";
const long channelId = Your Channel ID;
const int trigPin = 10;
const int echoPin = 30;


NewPing sonar(trigPin, echoPin);


WiFiClient client;


void setup() {
```

```
Serial.begin(115200);


// Connect to Wi-Fi
WiFi.begin(ssid, password);
while (WiFi.status() != WL_CONNECTED) {
delay(1000);
Serial.println("Connecting to WiFi...");
}
Serial.println("Connected to WiFi");


ThingSpeak.begin(client);
}


void loop() {
unsigned int distance = sonar.ping_cm();


Serial.print("Distance: ");
Serial.print(distance);
Serial.println(" cm");


updateThingSpeak(distance);


delay(10000); }


void updateThingSpeak(unsigned int distance) {
ThingSpeak.setField(1, static_cast<float>(distance));
int status = ThingSpeak.writeFields(channelId, thingSpeakApiKey);


if (status == 200) {
Serial.println("ThingSpeak update successful!");
} else {
Serial.println("Error updating ThingSpeak. HTTP error code: " + String(status));
}
}
```

Website for viewing the real time data for smart water management: