Žilinská Univerzita v Žiline
Fakulta riadenia a informatiky

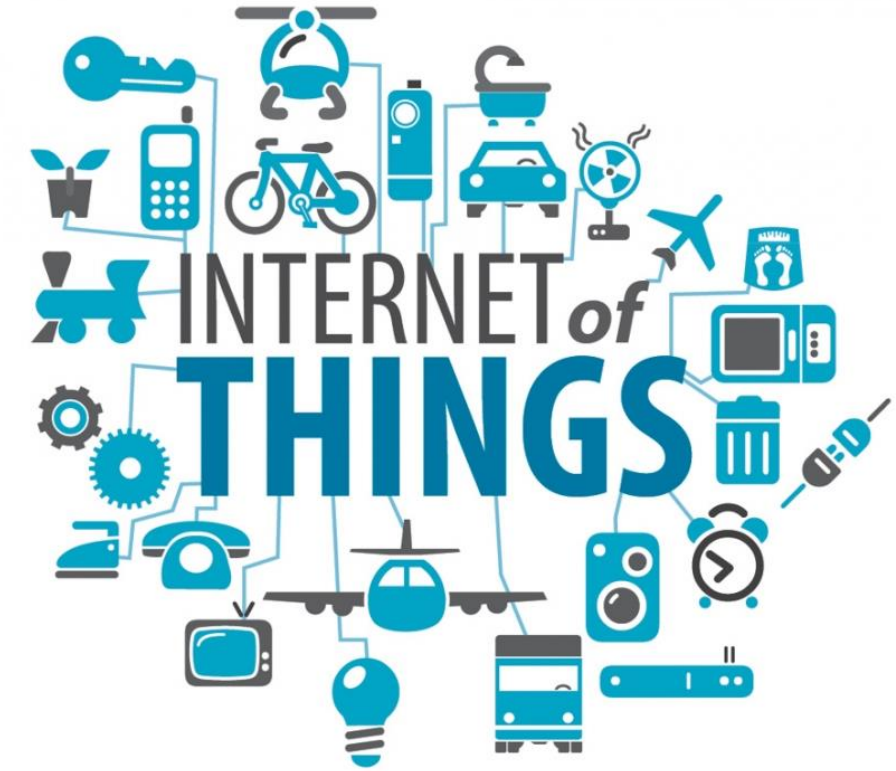
Internet vecí (IoT)

Cloudové služby a riešenia

Ing. Lukáš Formanek

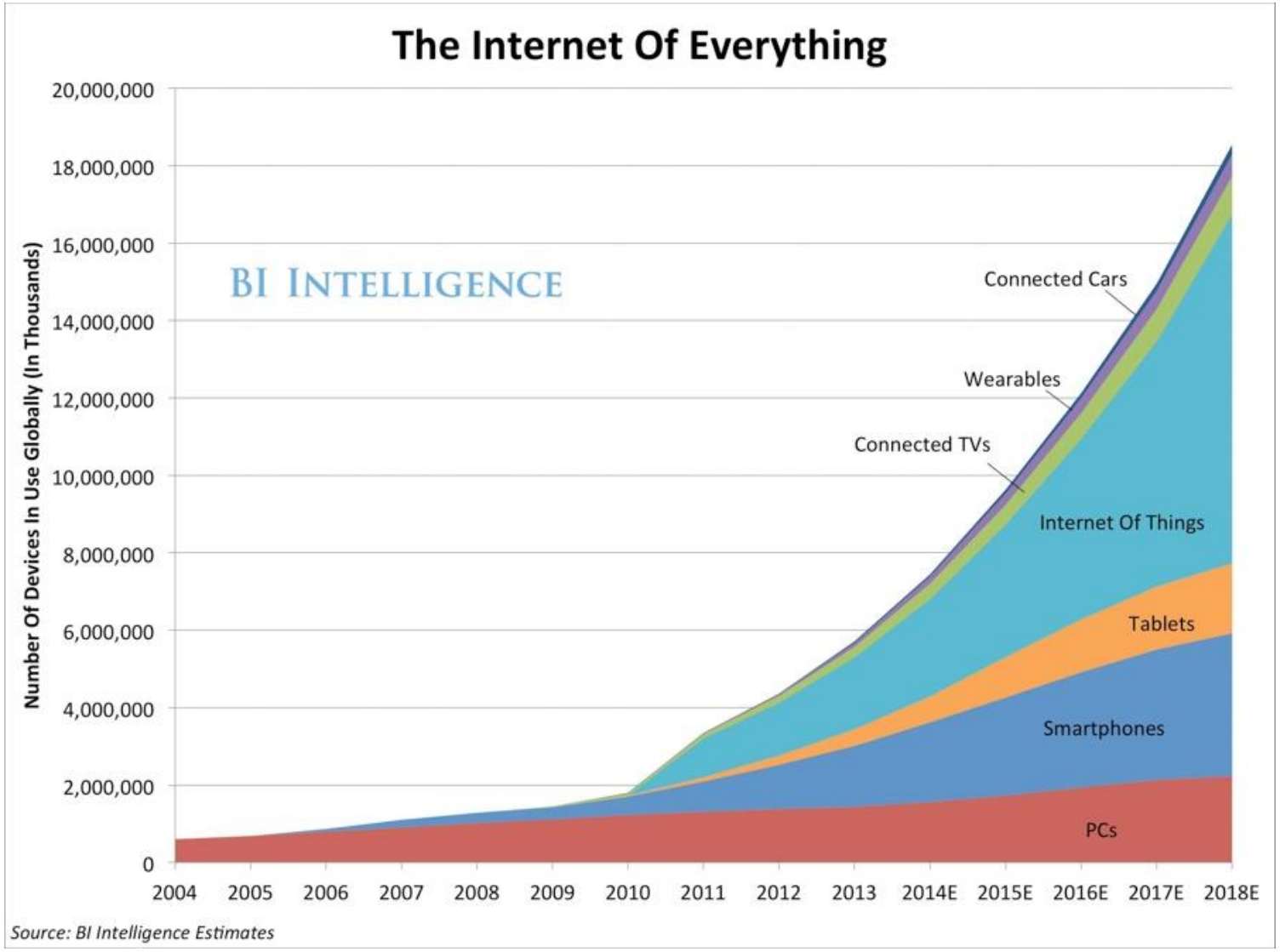
Internet vecí

- Prepojenie zariadení s internetovou konektivitou
- Najmä bezdrôtové
- Možnosti interakcie s používateľom
- Možnosti interakcie medzi systémami
- Sledovanie, ovládanie, zabezpečenie




Security and Alarm
Light Control
HVAC Control
Motion sensor
Door Control
Environmental monitoring
Window Control
STB
Remote Control

Podiel počtu zariadení pripojených k internetu (2014)



Cloud

- „Oblak“ tvorený internetovou sieťou a servermi
- Poskytovanie služieb alebo programov uložených na serveroch na internete
- Prístup používateľa napr. pomocou web prehliadača, alebo klienta danej aplikácie

Cloudové služby

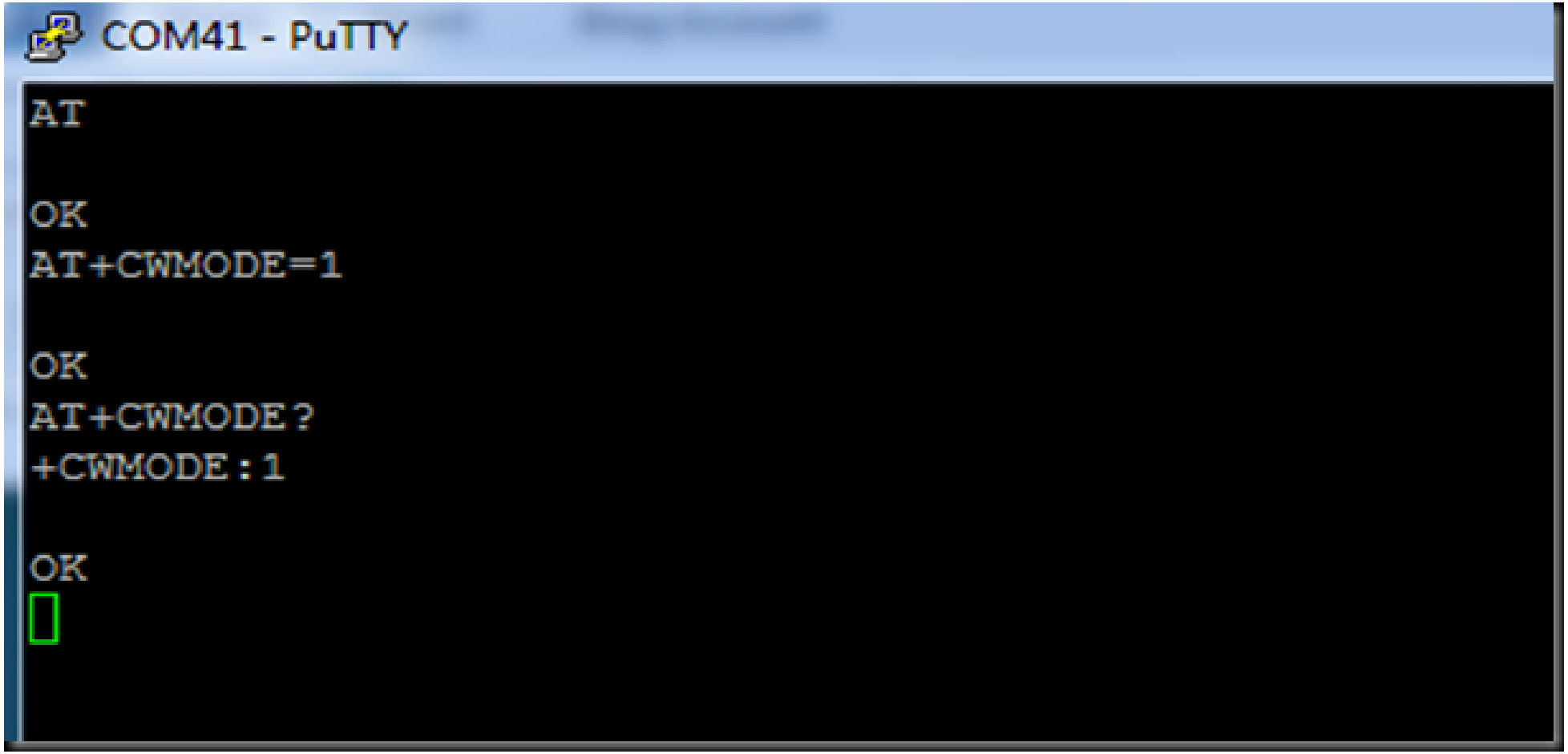
- **Úložný priestor (storage)**
- Práca na diaľku (Office Web Apps)
- Cloudový systém (Chrome OS)
- Online IDE (tutorialspoint)
- ...

Dropbox

Naša IoT aplikácia

- **WiFi modul ESP8266**
- IEEE 802.11 b/g/n WiFi
- Môže byť ovládaný cez UART rozhranie pomocou AT príkazov
- Dokáže fungovať samostatne s vlastným softvérom
- Módy: AP, STA, AP+STA
- Server (web server) , klient (napr. -> cloud)
- Výhody / nevýhody

Ukážka AT príkazov (komunikácia s WiFi modulom)

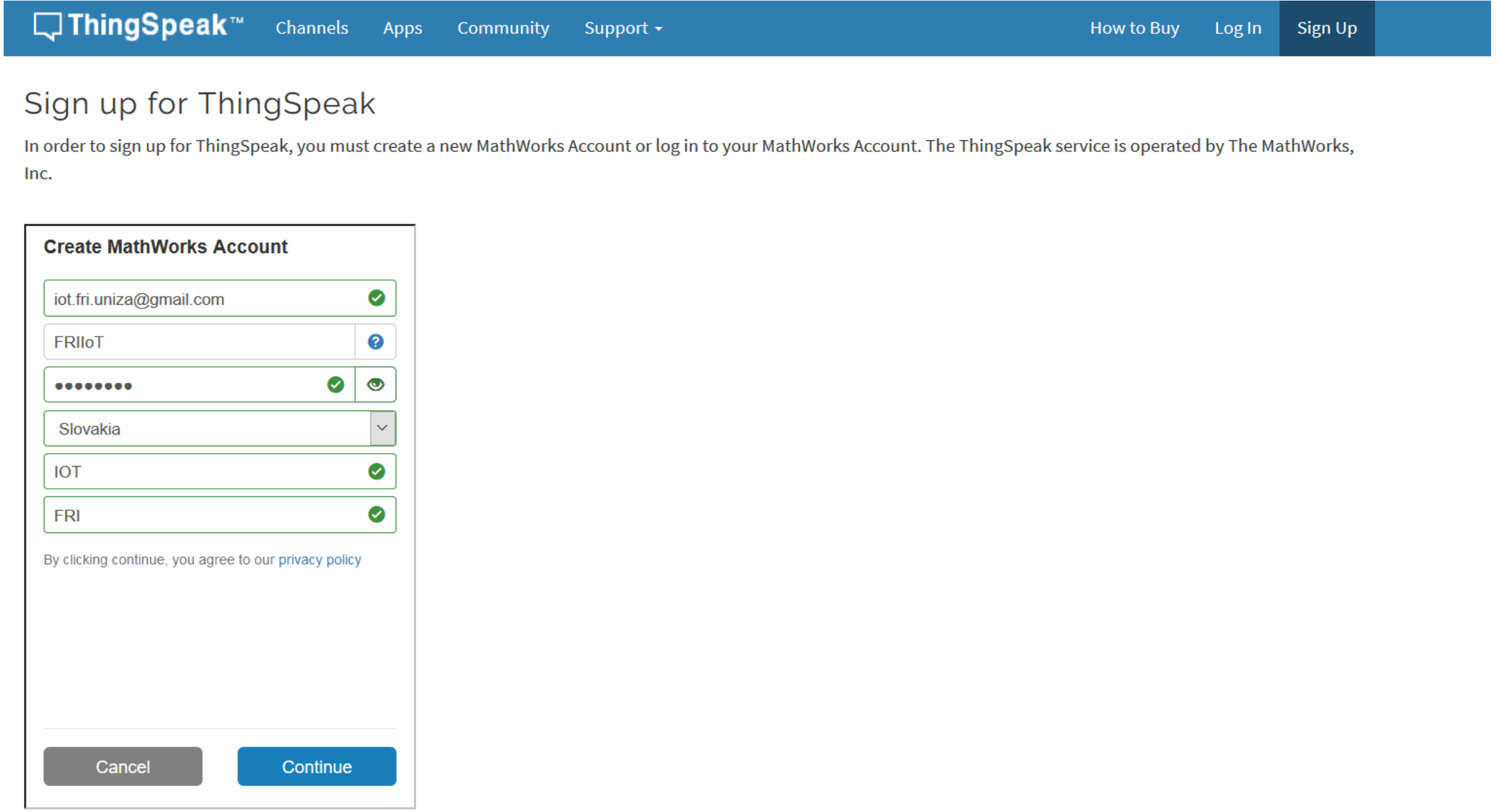


Cloudové služby pre IoT

- Uchovanie a spracovanie nameraných dát
- Vizualizácia nameraných veličín
- Analýza
- Interakcia

ThingSpeak

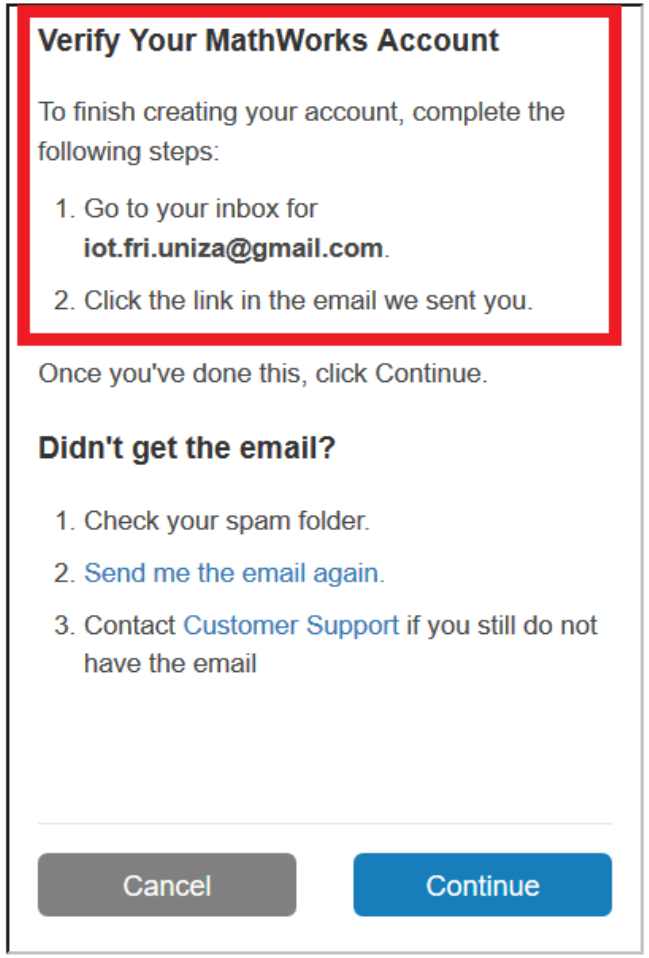
- Cloudová služba pre IoT
- Umožňuje uchovávať, vizualizovať, analyzovať a spracovávať dátové toky priamo v cloude v reálnom čase
- Možnosť spracovania údajov s využitím MATLAB podpory priamo v cloude
- Jednoduchá konfigurácia
- Vizualizácia


ThingSpeak™
Channels
Apps
Community
Support
How to Buy
Log In
Sign Up
Sign up for ThingSpeak
In order to sign up for ThingSpeak, you must create a new MathWorks Account or log in to your MathWorks Account. The ThingSpeak service is operated by The MathWorks, Inc.
Create MathWorks Account
iot.fri.uniza@gmail.com
FRIIoT
Slovakia
IOT
FRI
By clicking continue, you agree to our privacy policy
Cancel
Continue

ThingSpeak™ Channels Apps Community Support How to Buy Log In Sign Up

Sign up for ThingSpeak

In order to sign up for ThingSpeak, you must create a new MathWorks Account or log in to your MathWorks Account. The ThingSpeak service is operated by The MathWorks, Inc.



My Channels

New Channel

Help

Collect data in a ThingSpeak channel from a device, from another channel, or from the web. Click **New Channel** to create a new ThingSpeak channel.

Learn to create channels, explore and transform data.

Learn more about ThingSpeak Channels.

Examples

- Arduino
- Arduino MKR1000
- ESP8266
- Raspberry Pi
- Netduino Plus

New Channel

Name IoT

Description Svetelný senzor

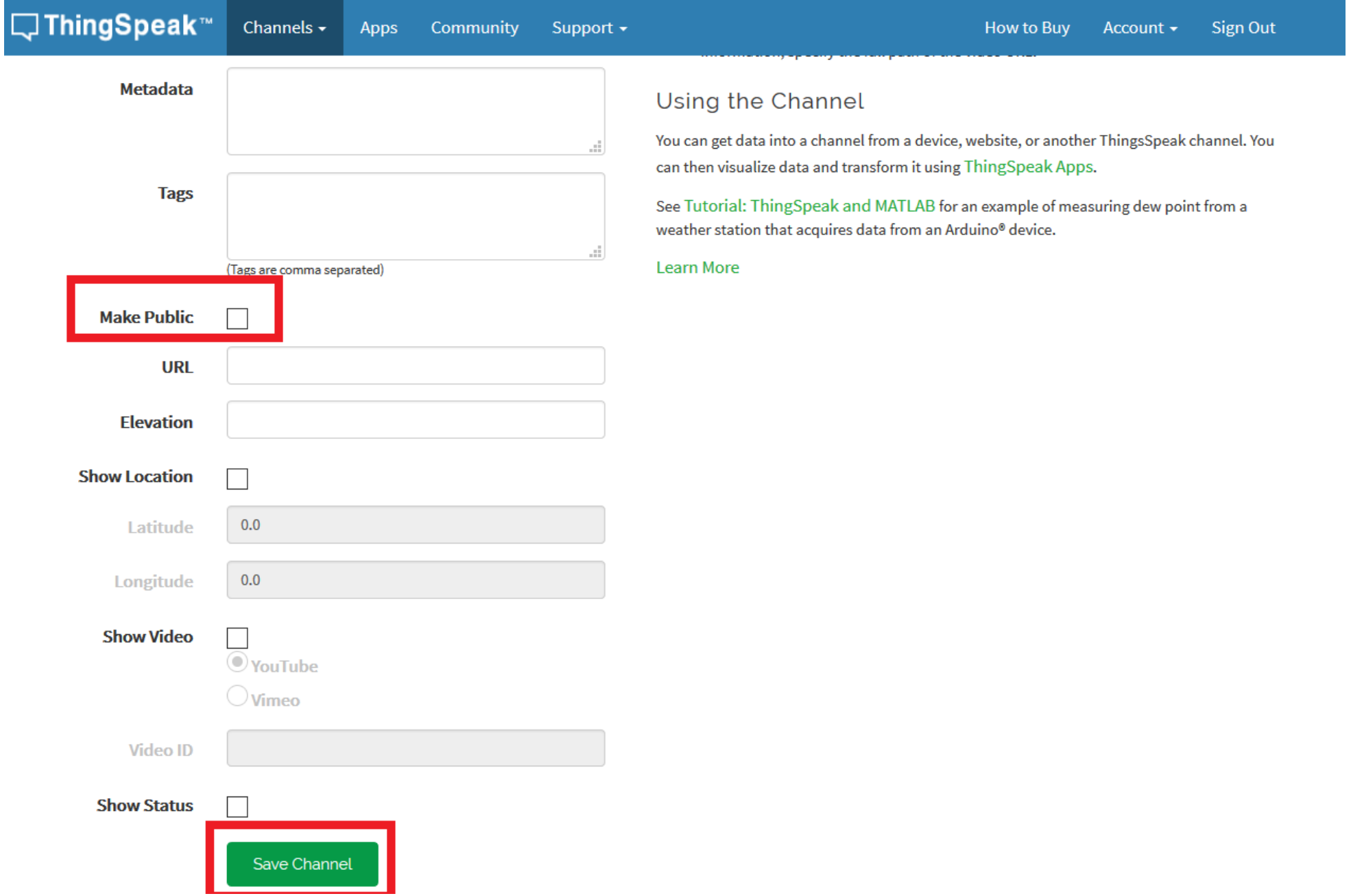
Field 1	Svetelný senzor	☑
Field 2		☐
Field 3		☐
Field 4		☐
Field 5		☐
Field 6		☐
Field 7		☐
Field 8		☐

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

- **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.
- **Latitude:** Specify the position of the sensor or thing that collects data in decimal degrees. For example, the latitude of the city of London is 51.5072.
- **Longitude:** Specify the position of the sensor or thing that collects data in decimal degrees. For example, the longitude of the city of London is -0.1275.
- **Elevation:** Specify the position of the sensor or thing that collects data in meters. For example, the elevation of the city of London is 35.052.
- **Make Public:** If you want to make the channel publicly available, check this box.
- **URL:** If you have a website that contains information about your ThingSpeak channel, specify the URL.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Account
Sign Out
Metadata
Tags
(Tags are comma separated)
Make Public
URL
Elevation
Show Location
Latitude
0.0
Longitude
0.0
Show Video
YouTube
Vimeo
Video ID
Show Status
Save Channel
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 Tutorial: ThingSpeak and MATLAB for an example of measuring dew point from a weather station that acquires data from an Arduino® device.
Learn More

ThingSpeak™ Channels Apps Community Support How to Buy Account Sign Out

IoT

Channel ID: **233715**
Author: friiot
Access: Public

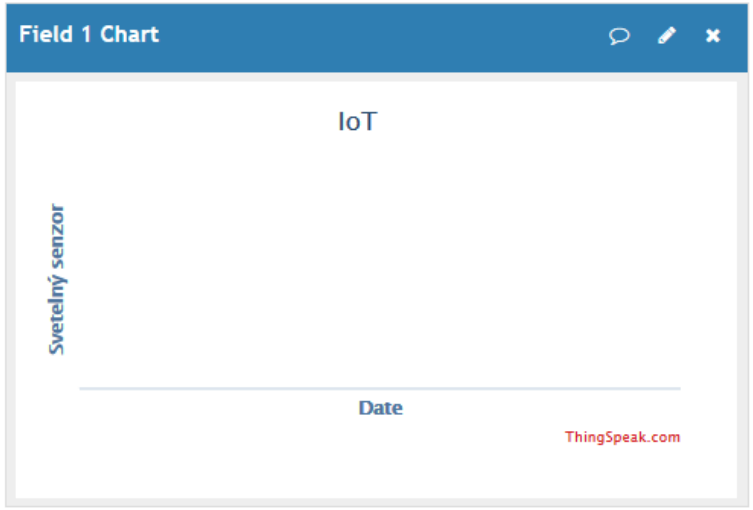
Svetelný senzor

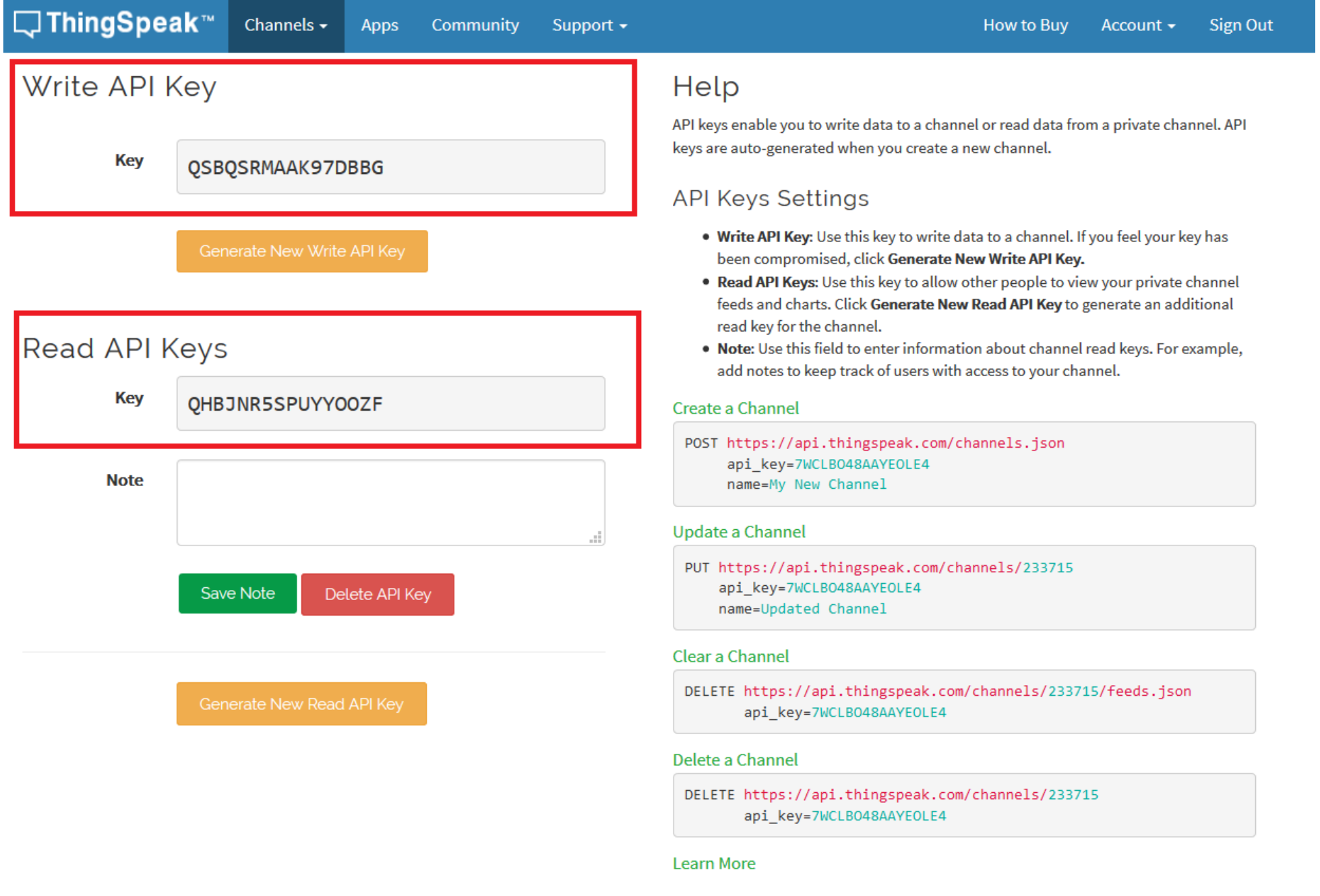
Private View | Public View | Channel Settings | API Keys | Data Import / Export

Add Visualizations | Data Export | MATLAB Analysis | MATLAB Visualization

Channel Stats

Created: about a minute ago
Updated: about a minute ago
Entries: 0

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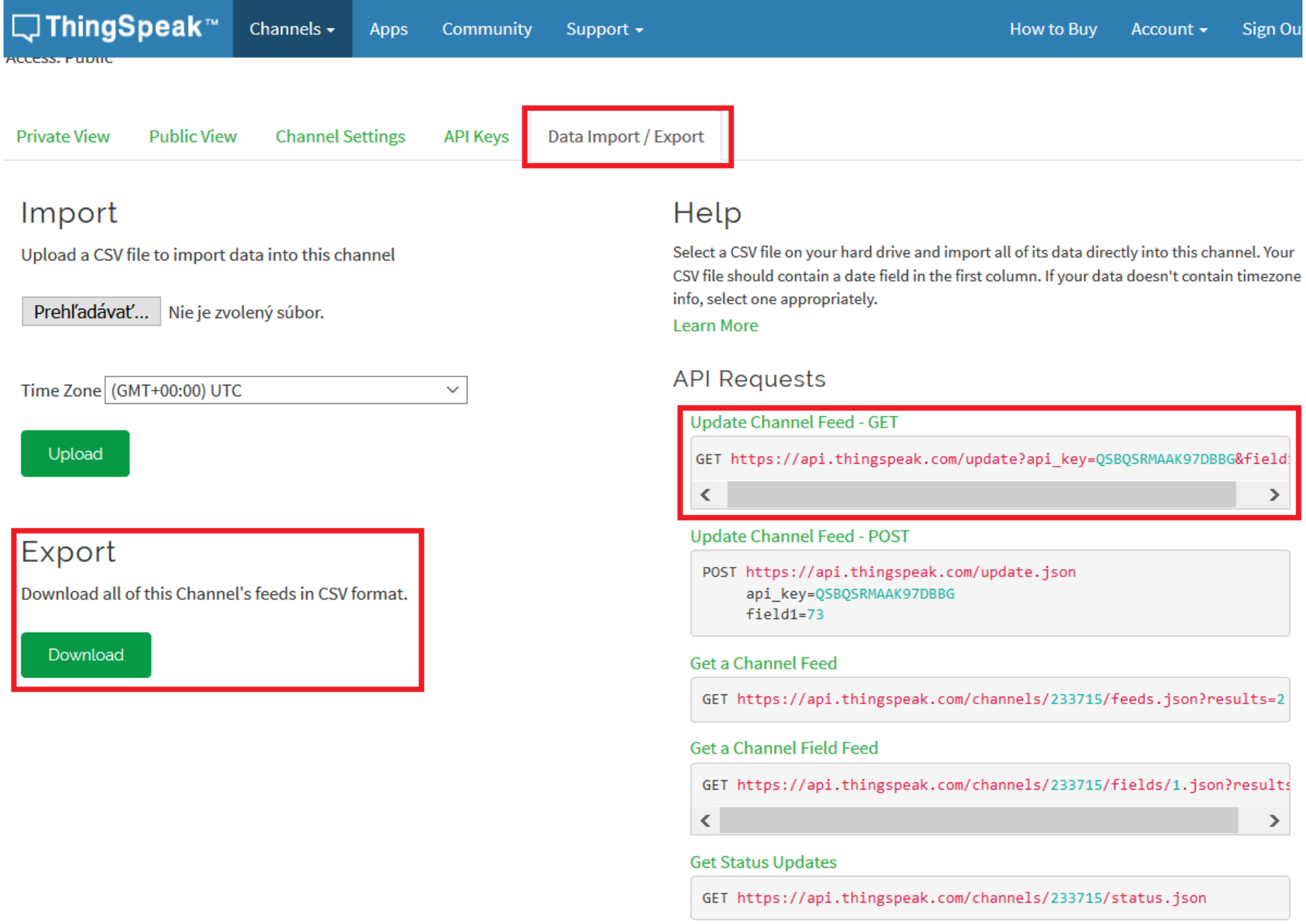
Sign Out
Write API Key
Key
QSBQSRMAAK97DBBG
Generate New Write API Key
Read API Keys
Key
QHBJNR5SPUYYOOZF
Note
Save Note
Delete API Key
Generate New Read API Key
Help
API keys enable you to write data to a channel or read data from a private channel. API keys are auto-generated when you create a new channel.
API Keys Settings
Write API Key: Use this key to write data to a channel. If you feel your key has been compromised, click Generate New Write API Key.
Read API Keys: Use this key to allow other people to view your private channel feeds and charts. Click Generate New Read API Key to generate an additional read key for the channel.
Note: Use this field to enter information about channel read keys. For example, add notes to keep track of users with access to your channel.
Create a Channel
POST https://api.thingspeak.com/channels.json
api_key=7WCLBO48AAYEOLE4
name=My New Channel
Update a Channel
PUT https://api.thingspeak.com/channels/233715
api_key=7WCLBO48AAYEOLE4
name=Updated Channel
Clear a Channel
DELETE https://api.thingspeak.com/channels/233715/feeds.json
api_key=7WCLBO48AAYEOLE4
Delete a Channel
DELETE https://api.thingspeak.com/channels/233715
api_key=7WCLBO48AAYEOLE4
Learn More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Apps
Community
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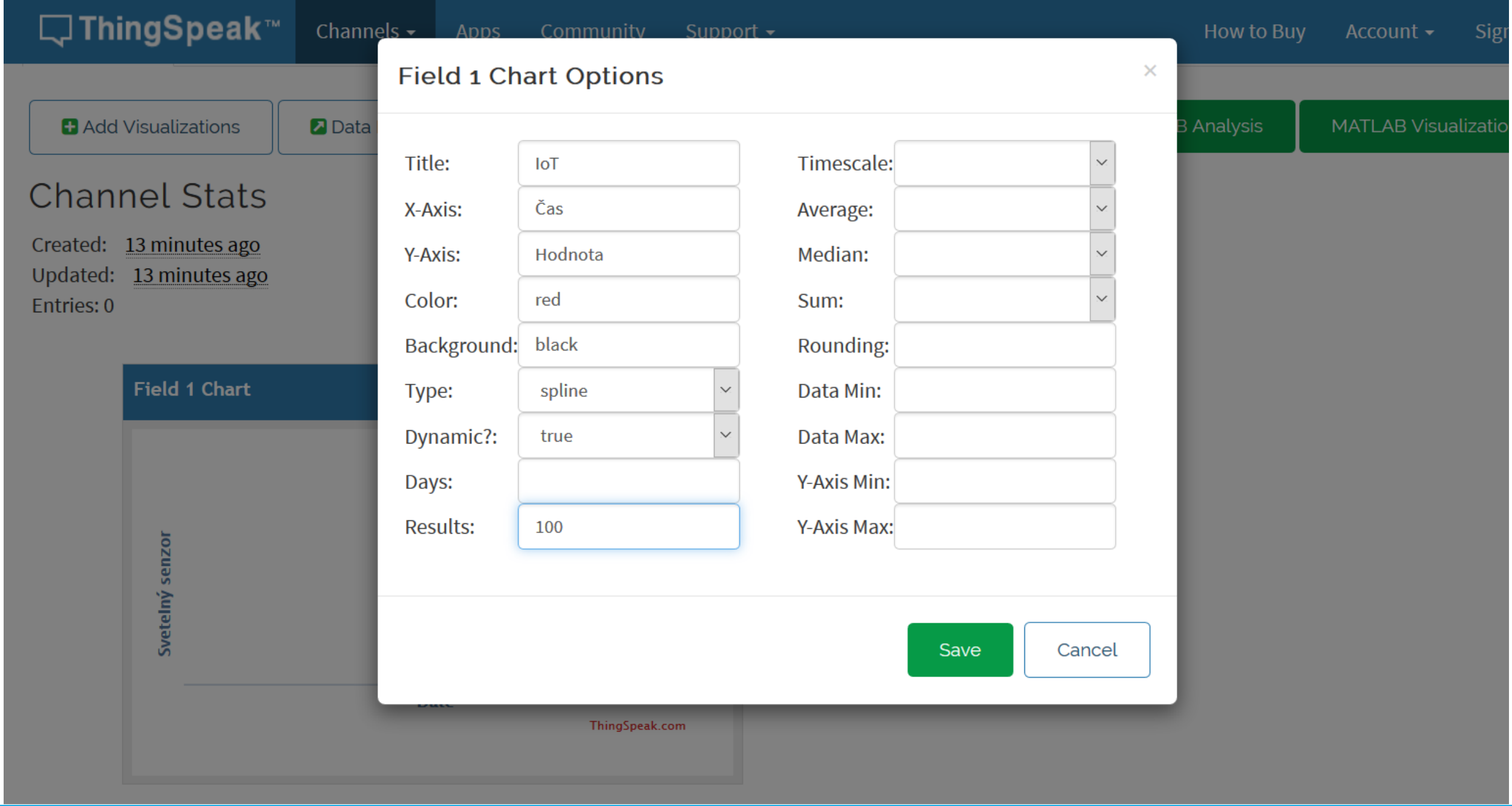
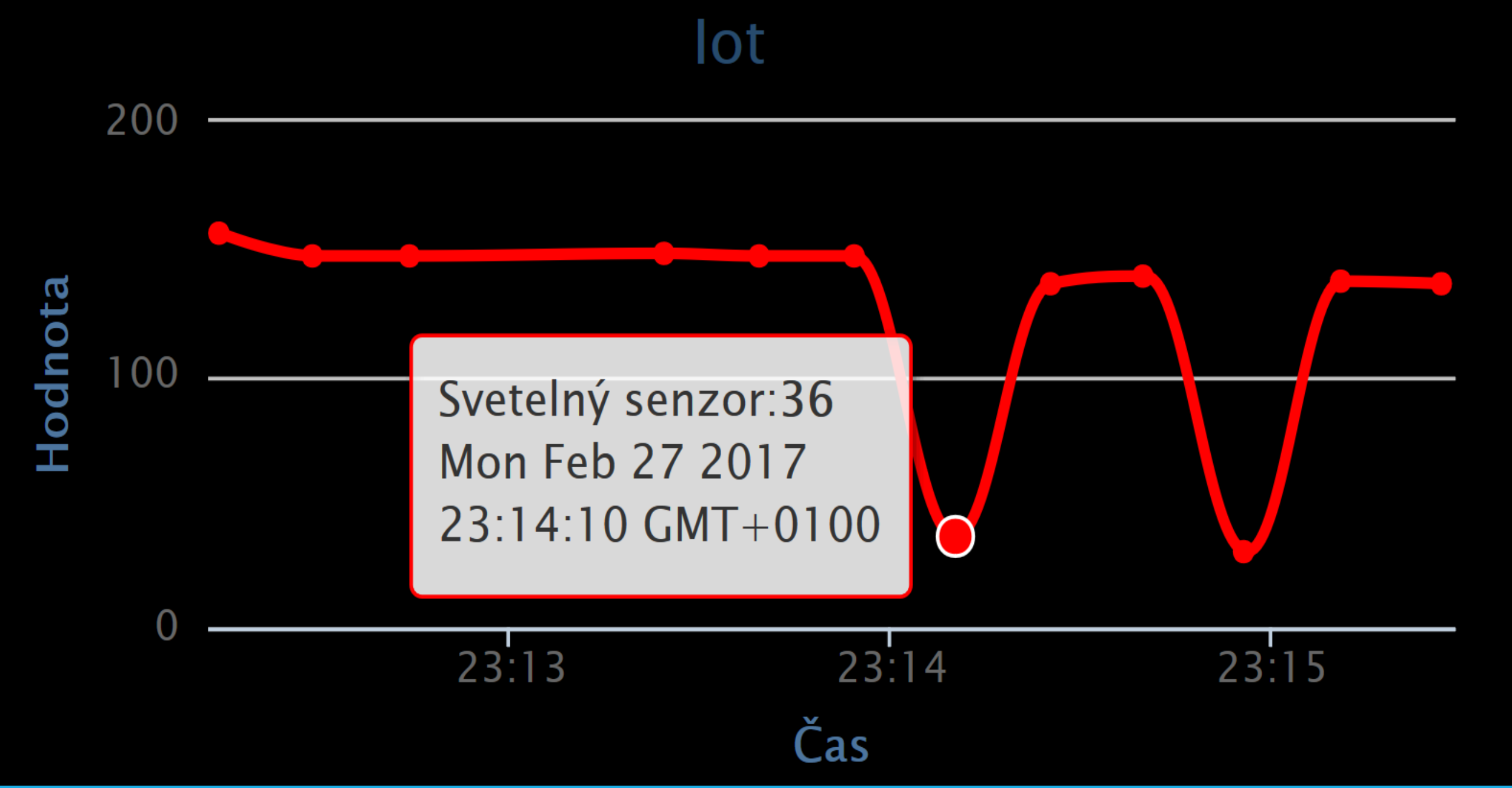
How to Buy
Account
Sign Ou
Private View
Public View
Channel Settings
API Keys
Data Import / Export
Import
Upload a CSV file to import data into this channel
Prehľadávať...
Nie je zvolený súbor.
Time Zone
(GMT+00:00) UTC
Upload
Export
Download all of this Channel's feeds in CSV format.
Download
Help
Select a CSV file on your hard drive and import all of its data directly into this channel. Your CSV file should contain a date field in the first column. If your data doesn't contain timezone info, select one appropriately.
Learn More
API Requests
Update Channel Feed - GET
GET https://api.thingspeak.com/update?api_key=QSBQSRMAAK97DBBG&field
Update Channel Feed - POST
POST https://api.thingspeak.com/update.json
api_key=QSBQSRMAAK97DBBG
field1=73
Get a Channel Feed
GET https://api.thingspeak.com/channels/233715/feeds.json?results=2
Get a Channel Field Feed
GET https://api.thingspeak.com/channels/233715/fields/1.json?results
Get Status Updates
GET https://api.thingspeak.com/channels/233715/status.json


ThingSpeak™
Channels
Apps
Community
Support
How to Buy
Account
Add Visualizations
Data
B Analysis
MATLAB Visualizatio
Channel Stats
Created: 13 minutes ago
Updated: 13 minutes ago
Entries: 0
Field 1 Chart
Svetelný senzor
ThingSpeak.com
Field 1 Chart Options
Title: IoT
X-Axis: Čas
Y-Axis: Hodnota
Color: red
Background: black
Type: spline
Dynamic?: true
Days:
Results: 100
Timescale:
Average:
Median:
Sum:
Rounding:
Data Min:
Data Max:
Y-Axis Min:
Y-Axis Max:
Save
Cancel


Iot
200
100
0
Hodnota
Svetelný senzor:36
Mon Feb 27 2017
23:14:10 GMT+0100
23:13
23:14
23:15
Čas

A ako vyzerá komunikácia s mikrokontrolérom ?

AT

OK
AT+CWMODE_CUR=1

OK
AT+CWJAP_CUR="IoT","abcdefgh"
WIFI DISCONNECT
WIFI CONNECTED
WIFI GOT IP

OK
AT+CIPMUX=1

OK
AT+CIPSTART=0,"TCP","api.thingspeak.com",80
0,CONNECT

OK
AT+CIPSEND=0,48

OK
- **GET /update?api_key=PQSXOCYVUUB2MFDA&field1=36**

Recv 48 bytes

SEND OK

+IPD,0,2:100,CLOSED

Ukážka

- www.thingspeak.com
- Channels -> Search by user ID -> FRIIoT -> IoT

Ďakujem za pozornosť

☺