



Setup & Operation

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1. Introduction

The following document contains information about setting up and using the Takano IOT platform. Takano is a cloud-based platform that allows students, hobbyists as well as professionals who have any internet connectable hardware to communicate with it using simple http or https commands. Users can send any data such as sensors connected to their hardware to the cloud and in parallel monitor and send commands using a free app (takano app, available both on Android and ios) to their hardware.

2. Connecting to Takano

The setup is straight forward and intuitive. All what is required is a computer with a modern browser connected to the internet. User starts by entering the following URL on the browser: <https://iotsprint.com/takano>

He is presented with Fig 1.

The image shows a 'Sign up' form with the following elements:

- Header: **Sign up**
- reCAPTCHA: 'I'm not a robot' with a reCAPTCHA logo.
- Input fields: 'First Name', 'Family Name', 'Your Email', 'Password', and 'Repeat your password'.
- Buttons: A blue 'Register' button and a link 'I am already member, let me sign in'.

Fig 1.

The user fills the form before pressing on 'Register' button. If the user has already registered and wants to sign in to his account, he simply presses on 'I am already a member, let me sign in' link. He is then directed to page 4. Otherwise if all entered data is correct, he is presented with Fig 2. At this stage the user



should check his email as soon as possible to avoid registration cancellation. An email from 'takano' should be in his inbox with the following sentence:
To finalize your registration, press: [Here](#)

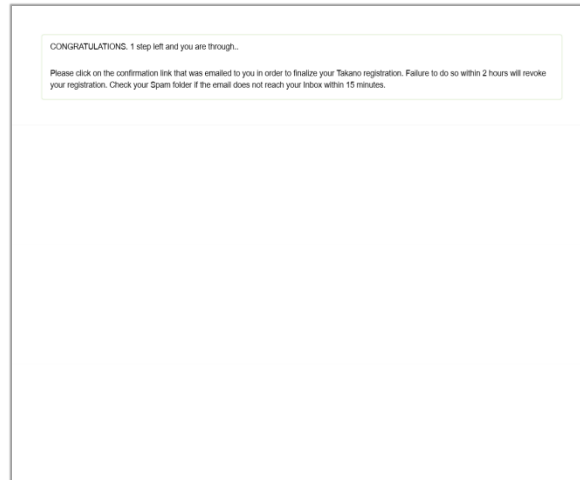


Fig 2.

After pressing on '[Here](#)' link, he is presented with Fig 3. The user credentials are now stored in the database and he can now sign in to takano platform as in Fig 4.

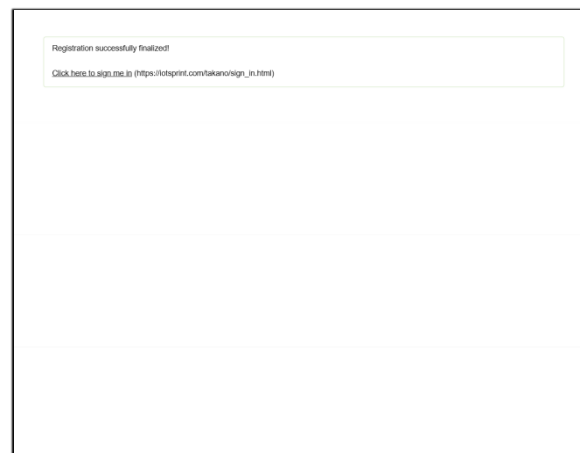


Fig 3.

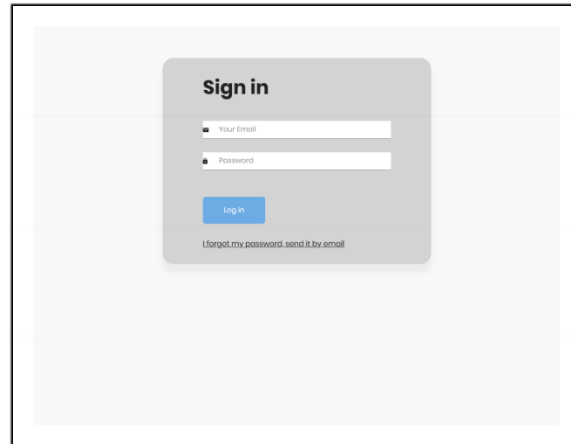


Fig 4.

3. Running Takano

Before delving into the ins and outs of the Takano platform, it is worth understanding its philosophy. When an individual signs up to takano, he automatically becomes the administrator of an account. He can have up to five hardware boards associated to his account, and each hardware board can have up to five different users (Fig 5). Each user can also be an administrator and have a separate account. The administrator can be a user, and a hardware#1 user can also be a user for hardware#4 for example. If the administrator is on a free plan, he is bound to a single hardware and a single user.

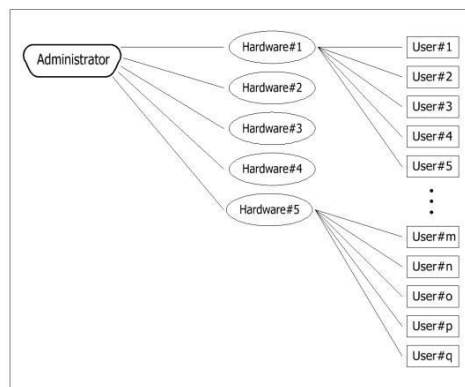


Fig 5.

After successfully signing in, the user is presented with the main Logged in page (or Admin page) as seen in Fig 6 below. It should be noted that the first time the user registers on Takano, he gets a free three-month subscription, which is also limited to a single hardware, a single user (himself) and two alarms. If he wishes to have more hardware, users and alarms, then he should go for a paid plan on <https://iotsprint.com>



Administrator		
First Name	Family Name	Email
john	doe	john.doe@horse@gmail.com
Privilege	Registration Date	Last Login
Free Plan	2019-02-27 06:13:42	0000-00-00 00:00:00

Change password

Fig 6.

On this page, he can check his previously-entered credentials, can change his sign in password by pressing on the 'Change password' button, and start operating Takano by pressing on the left margin links (Hardware, Users and Alarms). By pressing on 'Hardware' link on the left margin, he is presented with the hardware page (Fig 7.) Here he can specify a name for the hardware, for example Mountain_house, and enable takano to exchange data with the hardware by selecting the 'Enabled' tick. In some cases where the user wishes to know if the hardware is no longer communicating with the server, due for example to a power failure or an interrupted internet connection, he can select '1-Hour Time-out Notification' tick to instruct the server to send him a notification on his phone if the hardware fails to connect to the server for more than one continuous hour. The maximum bytes per message are fixed at 25 bytes for the free subscription and at 250 bytes for the paid subscription. The maximum alarms per hour are fixed at 2 for the free subscription and at 10 for the paid plan. The maximum number of users per hardware is fixed at 1 for the free plan and at 5 for the paid plan. The Hardware Registration key is the most important parameter on this page, this 12-character key is send by the hardware to the server inside the http(s) command together with other data such as sensors and control commands as we will later see. It allows the server to identify the hardware which is sending the request. The registration date stores the date and time this hardware was created on the server. The hardware last message date stores the date and time of the last message received from the hardware. This could be helpful when troubleshooting. In the Hardware message description field, the user enters the name of the parameters that will be stored on the server, and if they are numeric (such as analog data like a temperature value), then they can also have alarm values set on the server such as when exceeded, can trigger an email or push notification to the user. The hardware message field stores the last hardware-sent message, and the users message stores the last user-sent message. Since this is a static HTML page, the user has to press on the 'Reload Hardware Message' button



for the message to appear in the hardware message field. The same applies to the 'Reload Users Message'. The 'Request New Reg.Key' button will generate a new registration key for the hardware and effectively replacing the old one. This is useful if the user suspects that the current registration key has been discovered by an unwanted individual. The newly generated key should be programmed into the hardware as well, effectively replacing the old one. Finally the 'Save Changes' button will save all data in the database.

Pressing on the 'Alarms' link on the left margin will present the user with the alarms page (Fig 8). If we are on the free plan, we are bound to just two alarms, pressing on the 'Next Alarm' tab will display the page for the next alarm. This page is for setting

Fig 7.

The screenshot shows the 'Hardware' configuration page. On the left is a sidebar with navigation links: Admin, Hardware, Users, and Alarms. The main content area is titled 'Hardware' and contains several sections:

- Next Hardware**: A dropdown menu showing '1'.
- Name**: A text input field containing 'HardwareName'.
- Enabled**: A checkbox that is currently unchecked.
- 1-Hour Time-out Notification-Disabled**: A checkbox that is currently unchecked.
- Maximum Bytes per Message**: A text input field containing '25'.
- Maximum Alarms per Hour**: A text input field containing '4'.
- Maximum Number of Users**: A text input field containing '1'.
- Registration Key**: A text input field containing 'wifjmmx0x9'.
- Registration Date**: A text input field containing '2019-02-27 06:25:16'.
- Hardware Last Message Date**: A text input field containing '2019-02-27 06:25:16'.
- Hardware Message Description**: A text area containing 'Enter comma separated parameters: AlarmName1,AlarmName2'.
- Hardware Message**: A text area containing 'It_A'.
- Users Message**: A text area containing 'It_A'.

At the bottom of the page, there are four buttons: 'Request New Reg.Key', 'Save Changes', 'Reload Hardware Message', and 'Reload Users Message'.



limit values for analog or numeric data send by the hardware to the server. Should any limit be exceeded, then an email or push notification will be send to the user. The user has first to enable the alarm by ticking the 'Enabled' field. Then he has to enter the limit value in the threshold field. Also he has to specify if the alarm should be triggered when the hardware sent value exceeds (hence above field has to be ticked) or falls below (above field should be left empty). The hysteresis field value depends also on the above field we just mentioned: if the above field is set, and the threshold value is say 100, so if the hardware value goes beyond 100, then the alarm will be triggered (triggered filed will be set to 1). If we set the hysteresis value to 10, then the alarm will be reset when the hardware sent value goes below $100-10=90$. The opposite applies if the above field is left unticked. The last triggered date is obvious and stores the last date and time the alarm was triggered. Finally the 'Save Changes' button will save all user-entered data.

Fig 8.

Now pressing on the users tab on the left margin will present the user with the below page (Fig 9).

Fig 9.



Here the administrator can enter the user name (in the case of the free plan, it is his name, but if he is on the paid plan, he will specify the names of the other users as well). He can enable or disable a particular user, and can specify if a particular user can overwrite data on the server (read and write tick). Just like the hardware registration key enables a particular hardware to send data to the server, the user registration key allows a particular person to send data to the server. It has to be disclosed to the particular user only. The administrator can enable a push notification and email alarm for a user. Of course he has to specify the email of the user. The user last message date holds the date and time of the last message sent by the particular user. The 'Request New Reg.Key' will generate a new registration key, overriding the old one (if the administrator wishes to change a user key if it has been compromised by other unwanted individuals).

4. Testing Takano

After successfully filling the data from the hardware, alarms and users pages, now comes the time to test the takano platform. All what is needed for testing is a computer or tablet or phone with a modern browser. Supposing the hardware registration key is 'witjmvmoX9' and the parameters names are Temp and Hum, with above ticked, thresholds 100 and hysteresis 10 for the Temp, and above unticked, thresholds 60 and hysteresis 20 for the Humidity. We will mimic the hardware board sending data to the server. We start by launching the browser and entering the below sequence of characters in the url:

<http://iotsprint.com/tk.php?r=witjmvmoX9&m=Temp=120,Hum=30>

The browser should respond by 'N_A'. This is because the user so far has not sent anything to the server. If we go back to the hardware page and press on 'Reload Hardware Message' we should see 'Temp=120,Hum=30' in the hardware message. Now if we try another http request to the server:

<http://iotsprint.com/tk.php?r=witjmvmoX9&m=Temp=120,Hum=65>

we will notice that again the browser answered by 'N_A'. But if we check the email we entered johndoehorse@gmail.com, we will see an email received from takano with the following message: Takano hardware 'Mountain_house' alert! Parameter 'Hum' with a threshold of '60' has been exceeded by the value of '65' which is obvious because we set the email notification for the user and above tick for the Hum alarm and 60 as the threshold value. Now we will mimic the user sending data to the server

<https://iotsprint.com/uk.php?r=xxci1zqlmxry>

The browser will respond with: Temp=120,Hum=65 which are the values sent by the hardware last message. The user can also send any message to the server that will be stored on the server, and subsequently send back to the hardware, for example:

<https://iotsprint.com/uk.php?r=xxci1zqlmxry&m=Temp=110,Hum=25>

Takano offers more flexibility by not bounding either the hardware or the user to exchange messages that strictly contain hardware parameters that were declared in



the hardware section of the administrator account. For example the hardware can send the following command:

http://iotsprint.com/tk.php?r=witjmvmoX0x9&m=Powering_up_after_reset

And the user can reply with:

https://iotsprint.com/uk.php?r=xxci1zlgmxry&m=well_received

Better yet, the hardware can directly send an email containing whatever message to the user:

http://iotsprint.com/tk.php?r=witjmvmoX0x9&m=EMERGENCY_FUEL_LEVEL_LOW!!|e

Or even directly a push notification to the user:

http://iotsprint.com/tk.php?r=witjmvmoX0x9&m=reminder_to_fill_tank|p

If the user stops receiving emails and push notifications, then he should remember that there is a limit to the number of emails/notifications per hour and these are limited to 5 in the free plan to 15 for the paid plan per hardware. Please note that takano push notifications cannot be received by the browser, but require the takano app to be downloaded to the user phone/tablet (available for both ios and Android). This application setup and operation are discussed in a separate pdf document, also available on the iotsprint website.

5. Contact information

For more information or comments, please do not hesitate to contact the Takano technical team by email at: info@iotsprint.com

We are available from 8:00AM (GMT+3) to 6:00PM (GMT+3).