

How to Use MQTT to Connect to the ioThinx 4510 Series

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Moxa is a leading provider of edge connectivity, industrial networking, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things. With over 30 years of industry experience, Moxa has connected more than 50 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for industrial communications infrastructures. Information about Moxa’s solutions is available at www.moxa.com.

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In this tutorial, you will learn how to use MQTT to configure a client as a publisher or subscriber. We demonstrate two scenarios: the ioThinX 4510 as a subscriber and the ioThinX 4510 as a publisher.

Prepare the Following Items

- ioThinX IIoT Starter Kit (ioThinX 4510, 45MR-1601, 45MR-2600, and 45MR-3800)
- Software: Mosquitto (1.5.8), MQTTlens, ioThinX 4510 (with firmware v1.1 installed)

Broker Settings on the Computer

Introduction to Mosquitto

For information about Eclipse Mosquitto, please refer to the following web page:

<https://mosquitto.org/>. Mosquitto can be used to implement versions 5.0, 3.1.1, and 3.1 of the MQTT protocol.



Host
IP address: 192.168.127.200

Moxa ioThinX 4510
IP address: 192.168.127.254

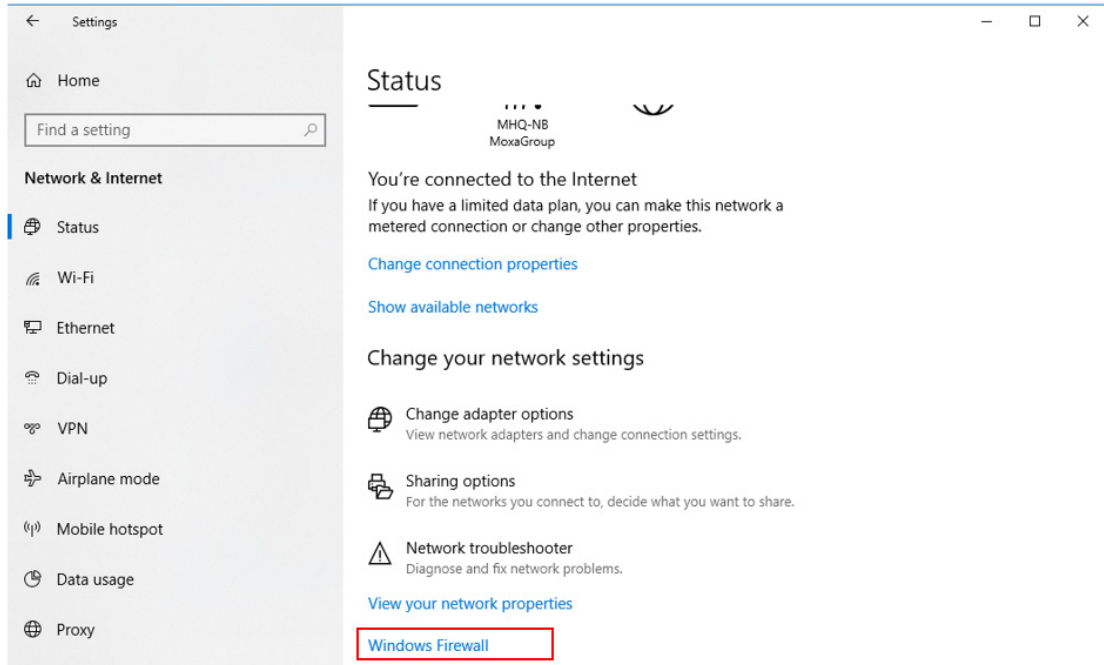
Install Mosquitto

Download **Mosquitto** from the following website and install it:

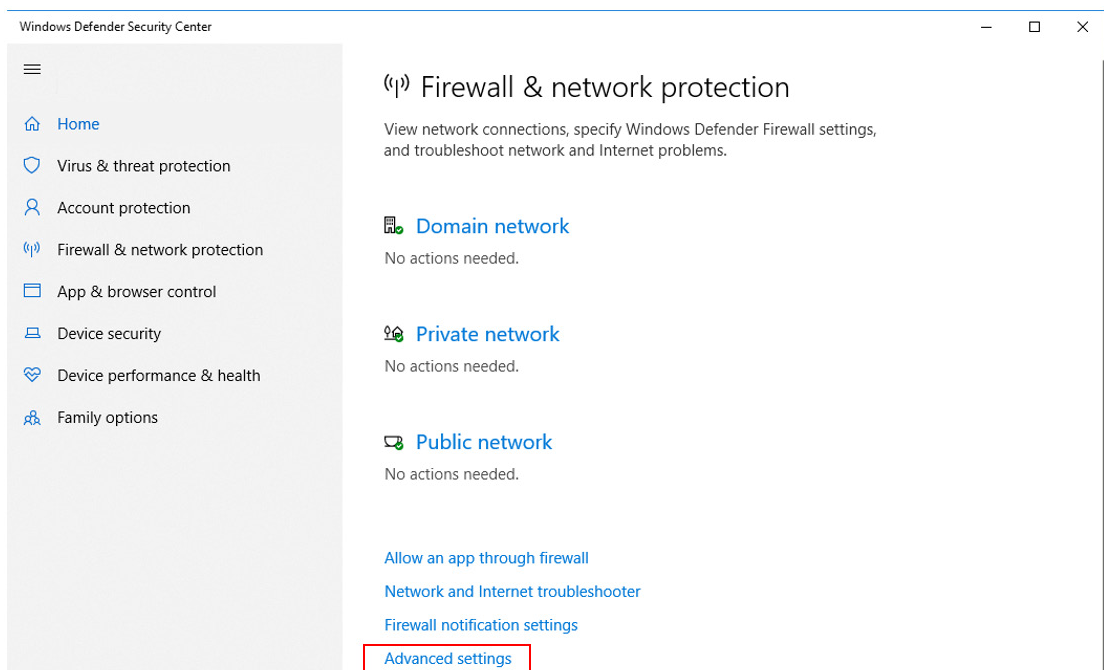
<https://mosquitto.org/download/>

Enable port 1883 on the firewall

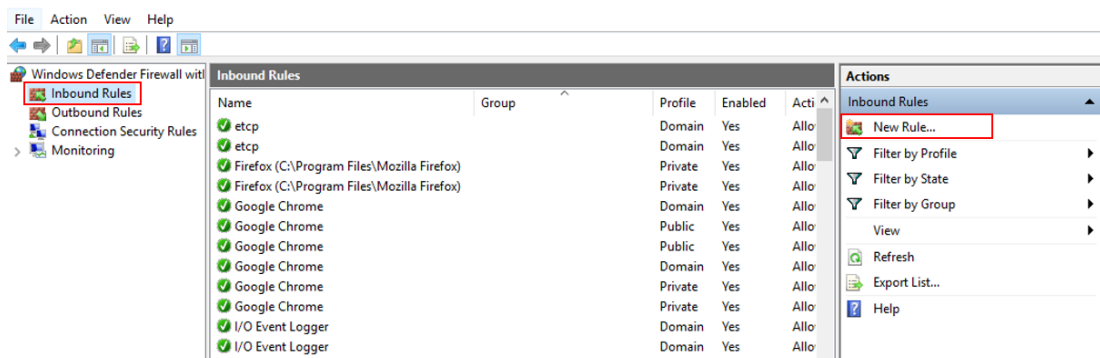
1. Here we use Windows 10 as an example. First, open the **Windows Firewall**.



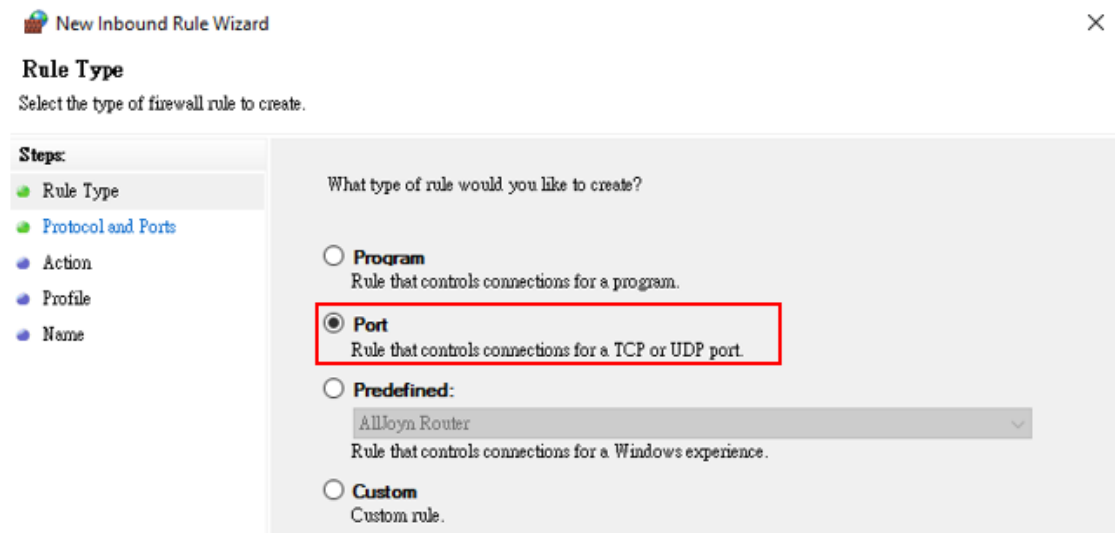
2. Select **Advanced settings**.



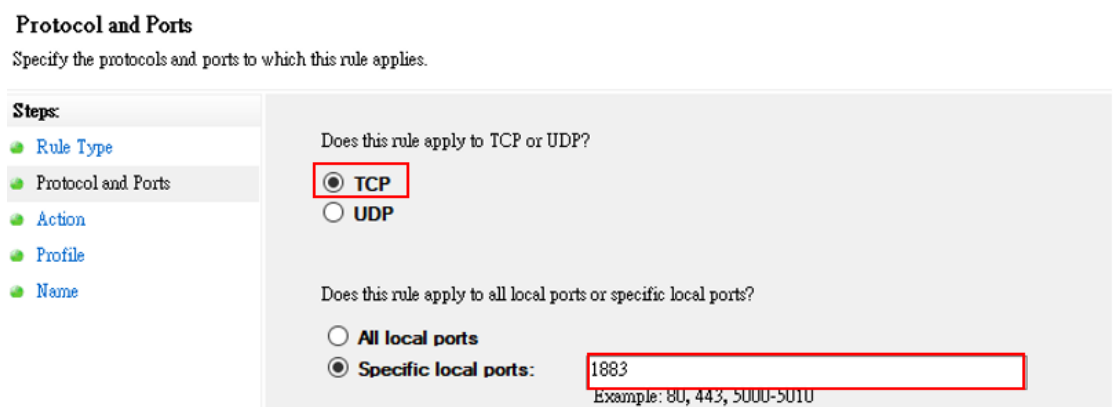
3. Select **Inbound Rules** and create a **New Rule**.



4. Select **Port** in the **Rule Type**.



5. Select **TCP** and enter **1883** in the **Specific local ports** input box.



6. Select **Allow the connection**.

Action

Specify the action to be taken when a connection matches the conditions specified in the rule.

Steps:

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

What action should be taken when a connection matches the specified conditions?

- Allow the connection**
This includes connections that are protected with IPsec as well as those are not.
- Allow the connection if it is secure**
This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.
[Customize...](#)
- Block the connection**

7. Select **Domain** and **Private**.

Profile

Specify the profiles for which this rule applies.

Steps:

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

When does this rule apply?

- Domain**
Applies when a computer is connected to its corporate domain.
- Private**
Applies when a computer is connected to a private network location, such as a home or work place.
- Public**
Applies when a computer is connected to a public network location.

8. Enter the **Name** and **Description (optional)**, and then click **Finish**.

Name

Specify the name and description of this rule.

Steps:

- Rule Type
- Protocol and Ports
- Action
- Profile
- Name

Name:
MQTT

Description (optional):

< Back Finish Cancel

9. Run **Mosquitto Broker** from **Task Manager**.

Type **Ctrl + Alt + Delete** to open **Task Manager**, click the **mosquitto** row to select it, and then right click in the status column and select **Start**.

Set Up MQTT on the ioThinX 4510

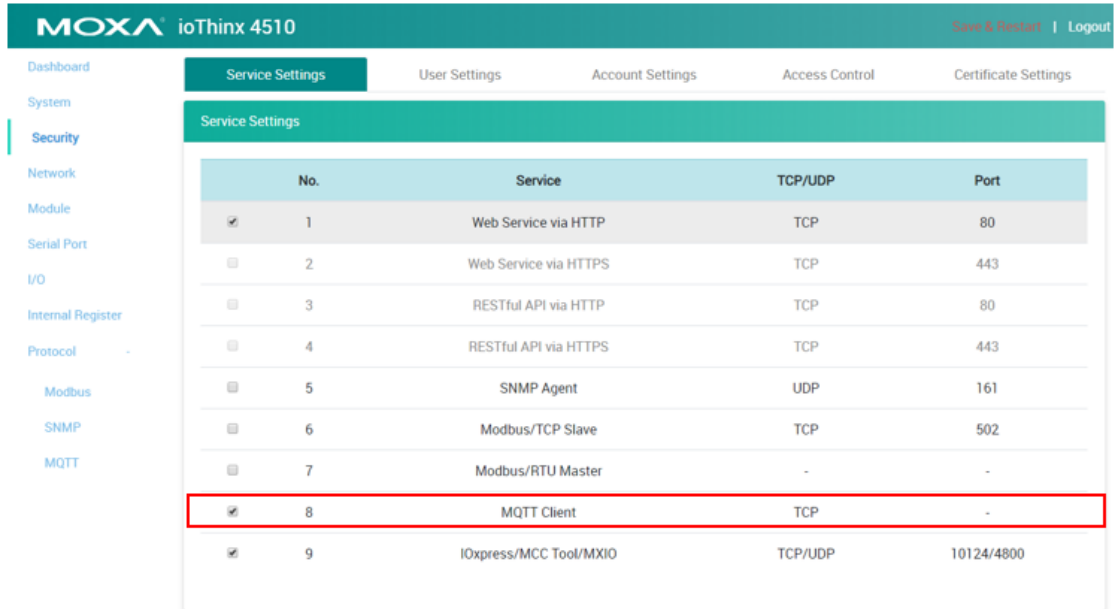
Enable MQTT Client Service

1. Log in to the ioThinX 4510:

Step 1: Open your web browser and type the default IP address of the device:
192.168.127.254.

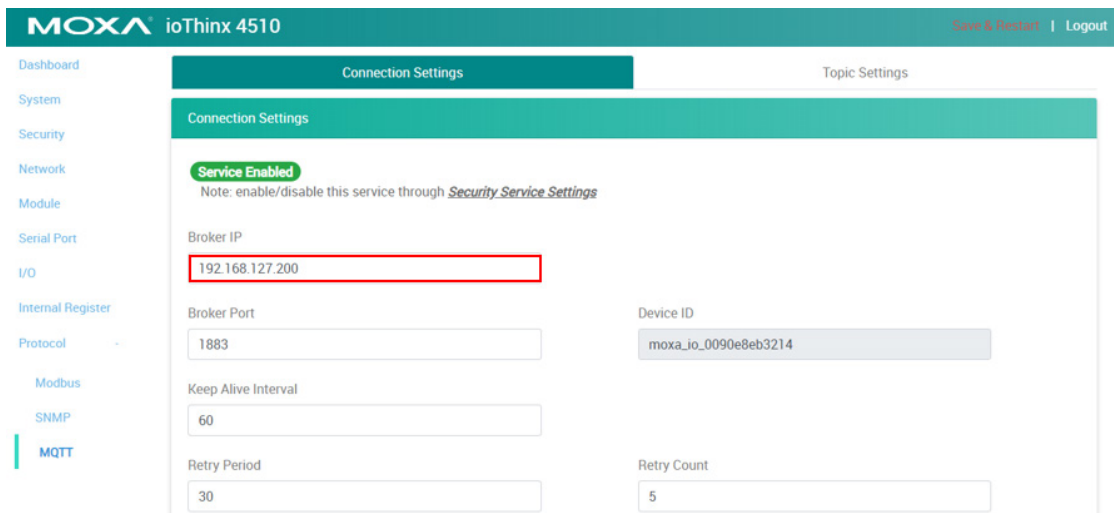
Step 2: On the login page, type the default username/password (admin/moxa) to log in to the Web Console.

2. Click **Security** in the left menu. Select **Service Settings** at the top of the page and then select **MQTT Client**.

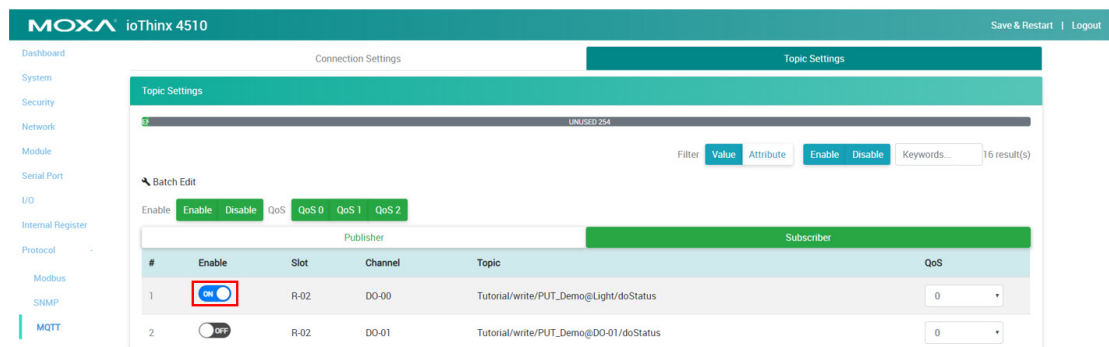
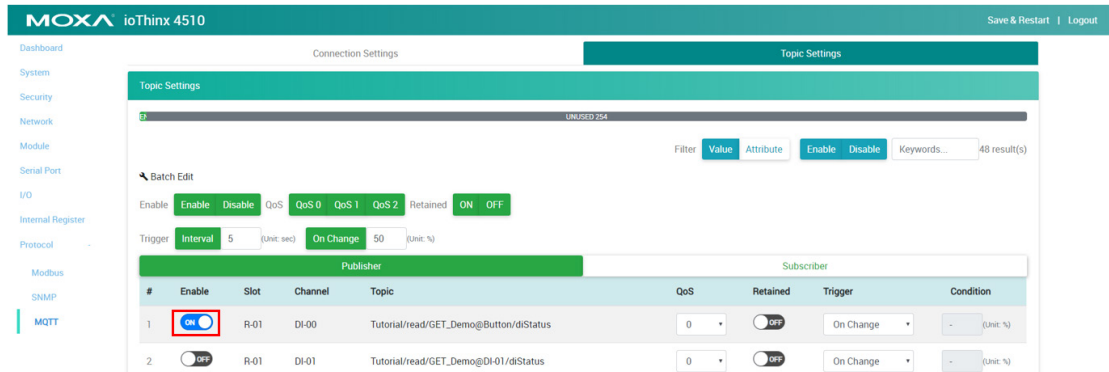


Connection and Topic Settings

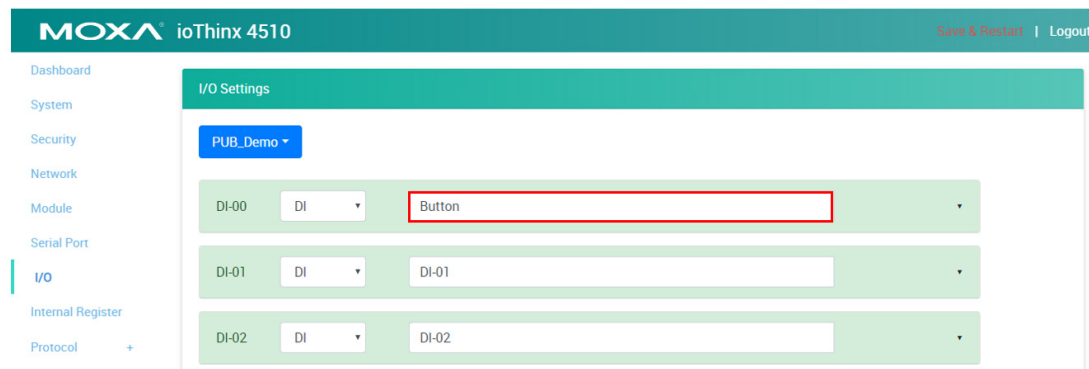
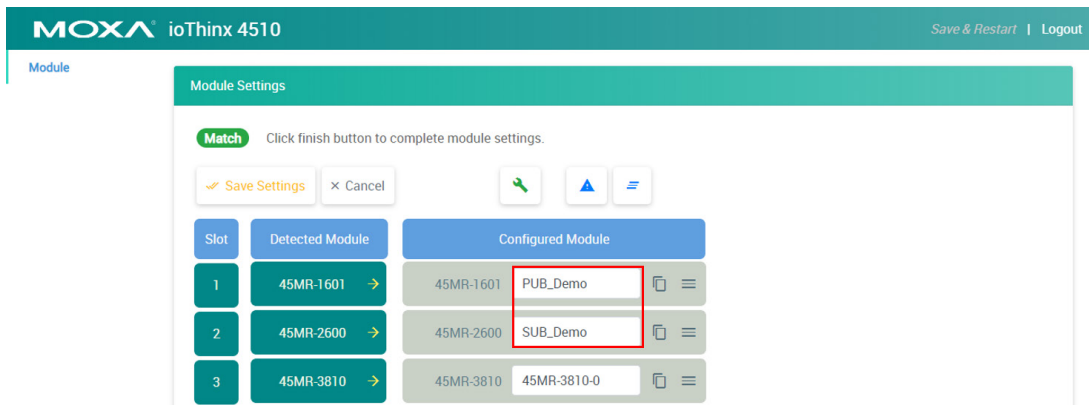
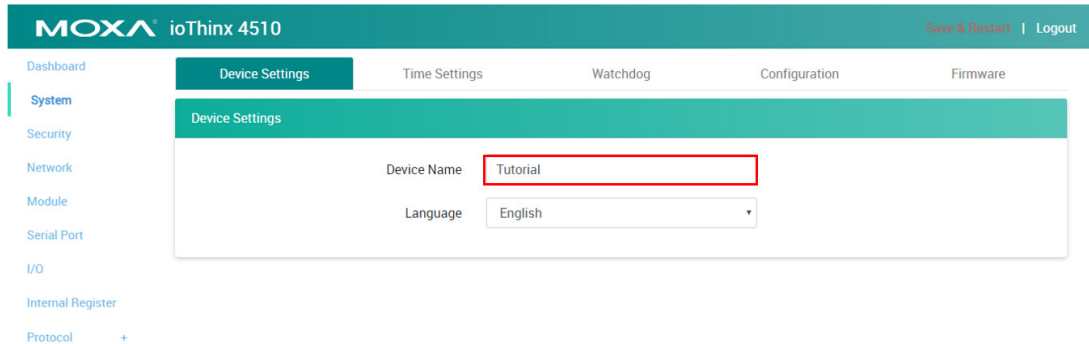
1. Select **MQTT** in the left menu and then set the **Broker IP** (your host's IP) under **Connection Settings**.



2. Click **Publisher** and enable **Topic#1 (DI-00)**, and then click **Subscriber** and enable **Topic#1 (DO-00)**.

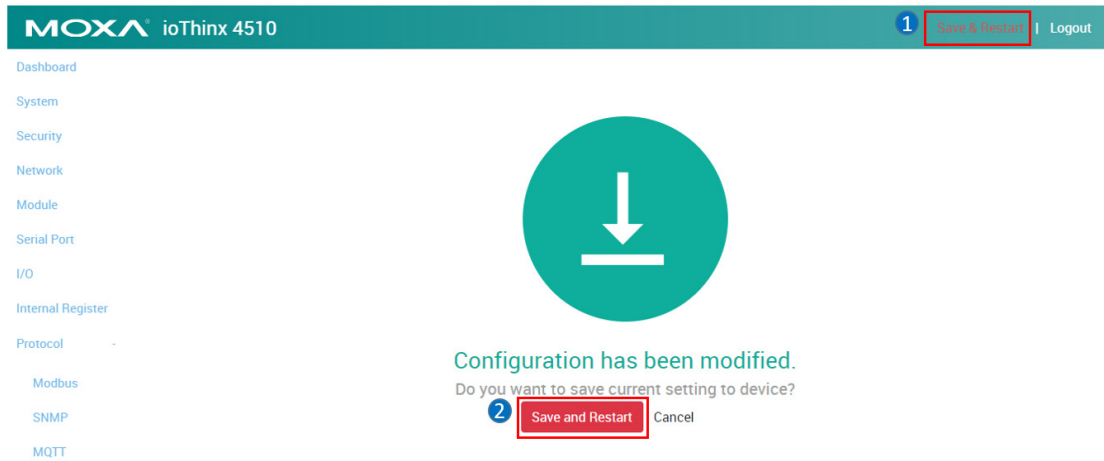


Note: The content of the **Topic** is based on **Device Name, Module name, and I/O channel**. You can change these values in **Device Settings, Module Settings, and I/O Settings**.



In this demonstration, we changed our **Topic #1 (DI-00 and DO-00)** as below:
Publisher **Topic#1**(DI-00):Tutorial/read/PUB_Demo@Button/diStatus
Subscriber **Topic#1**(DO-00):Tutorial/write/SUB_Demo@Light/doStatus

3. Click **Save & Restart** in the upper-right corner, and then click **Save and Restart** in the center of the page.



Publisher and Subscriber Settings

Introduction to MQTTLens

MQTTLens is a chrome application that supports MQTT communications. MQTTLens can be used to simulate communicating with the ioThinX 4510 via MQTT.

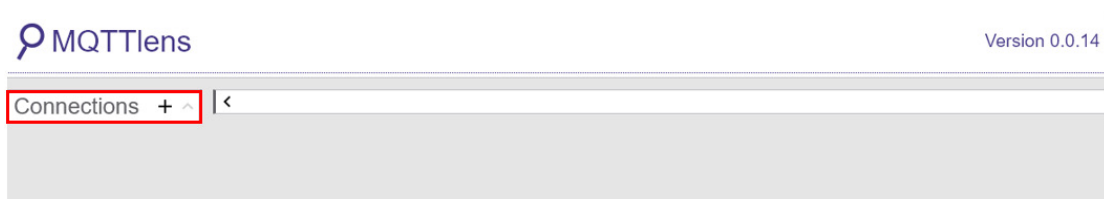
Configuring MQTTLens

1. Install **MQTTLens**

You can download **MQTTLens** from the following link:

<https://chrome.google.com/webstore/detail/mqttlens/hemojaaeigabkbcookmlgmdigohjobjm>

2. Add a new connection on **MQTTLens**



- Enter your **Connection name** and **Hostname** (broker IP) in the associated text input boxes.

Add a new Connection ✕

Connection Details

Connection name

Connection color scheme

Hostname

Port

Client ID

Generate a random ID

Session Clean Session
 Automatic Connection Automatic Connection

Keep Alive
 seconds

Scenario 1: Publish DI status to MQTTLens

- Publisher: ioThinX 4510
- Subscriber: MQTTLens

- Copy the topic from the ioThinX 4510 **MQTT publisher** tab.

Publisher					Subscriber				
#	Enable	Slot	Channel	Topic	QoS	Retained	Trigger	Condition	
1	<input checked="" type="checkbox"/>	R-01	DI-00	Tutorial/read/PUB_Demo@Button/diStatus	0	<input type="checkbox"/>	On Change	- (Unit: %)	

- Paste the topic into the subscribe column of the **MQTTLens**, and then click subscribe.

< Connection: ioThinX 4510
 Subscribe

SUBSCRIBE

- Press the DI0 button on the starter kit to trigger the DI-00 channel; you should see the DI value change on your subscriber.

Subscriptions

Topic: "Tutorial/read/PUB_Demo@Button/diStatus" Showing the last 5 messages — + Messages: 0/2

#	Time	Topic	QoS
0	10:31:43	{ "value": 1 }	0

Scenario 2: Turn on ioThinX 4510's DO channel

- Publisher: MQTTlens
 - Subscriber: ioThinX 4510
1. Copy the topic from the ioThinX 4510 **MQTT subscriber** page.

Publisher					Subscriber	
#	Enable	Slot	Channel	Topic	QoS	
1	<input checked="" type="checkbox"/>	R-02	DO-00	Tutorial/write/SUB_Demo@Light/doStatus	0	

2. Paste the **Topic** into the **MQTTlens** publish column.
3. Enter the following message:

Message

```
{  
  "value":1  
}
```

4. Click **Publish**. The DO-00 channel should respond by turning the light on.

