Azure IoT Hub Client SL

With the “Azure IoT Hub Client SL” library, CODESYS controllers can exchange messages with the “Azure IoT Hub” cloud service from Microsoft.

Product description

The “Azure IOT Hub” cloud service from Microsoft directly links IoT devices. (For more detailed information, refer to https://azure.microsoft.com/en-us/services/iot-hub/). The “Azure IoT Hub Client SL” library provides function blocks for sending and receiving messages. A sample project demonstrates how to use the library.

The library contains separate function blocks for communication via HTTPS and MQTT. The library supports the following functions:

- Send “Device to Cloud (D2C)” messages (telemetry data)
- Receive “Cloud to Device (C2D)” messages
- Read the device twin
- Update the device twin (desired properties only)
- Subscribe Device Twin (desired properties, MQTT only)
- Direct method call (Cloud -> Device, MQTT only)
- Creation of a new azure SaS token (Shared Access Signature)

The sample project “Azure IoT Client SL Example.project” demonstrates how to use the corresponding function blocks.

Getting started

1. Set up Azure IoT Hub and create devices in IoT Hub

see https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-create-through-portal
or https://docs.microsoft.com/en-us/azure/iot-hub/tutorial-connectivity

2. Generate shared access signatures (SaS tokens)

The authentication of a device is done via ‘Shared Access Signatures’ (SaS-Token). For access via MQTT, a SaS token based on the device policy ‘device’ is required. For access via HTTPS, an SaS token based on the device policy ‘device’ and an SaS token based on the policy ‘iothubowner’ are required. The SaS token can be generated e.g. via the Azure Cloud Shell (Azure Portal), via the tool ‘Azure IoT Explorer’, or via function in library GenerateSasToken(). The function GenerateSasToken requires 4 input parameters (url-adress, primary key, policy name, expiry) and returns SaS-Token as WSTRING(255).

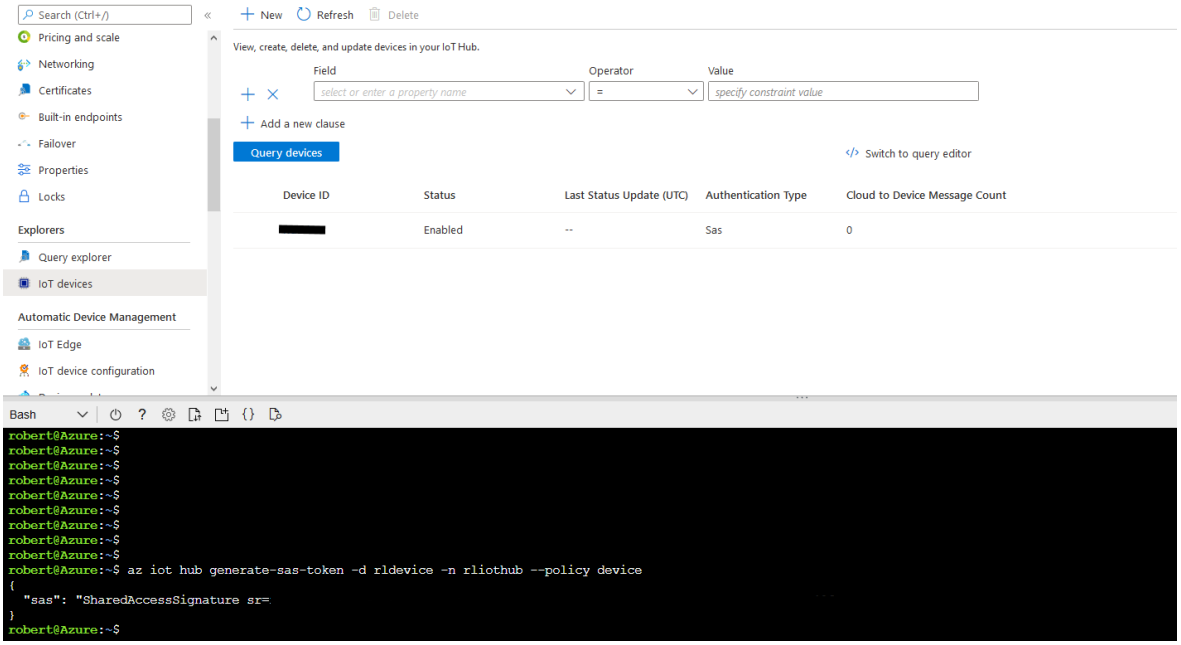
Start cloud shell via Azure Portal

Command to generate a SaS token ‘device’:

```
az iot hub generate-sas-token -d YOUR_DEVICE_ID -n YOUR_IOT_HUB --du
DURATION_IN_SECONDS --policy device
```

Command to generate a SaS token ‘iothubowner’:

```
az iot hub generate-sas-token -n YOUR_IOT_HUB --du DURATION_IN_SECONDS
```



Generate SaS-Token

For more information on ‘Cloud Shell’ and ‘Azure CLI’, click here:

https://docs.microsoft.com/en-us/cli/azure/iot/hub?view=azure-cli-latest

Alternatively, the ‘Azure IoT Explorer’ tool can be used to generate a SaS token (only for policy ‘device’).

> see https://github.com/Azure/azure-iot-explorer
> Download: https://github.com/Azure/azure-iot-explorer/releases

3. Setting the name of the IoT hub, device ID, and SaS token in the sample project

> `sSubDomainName`: Name of the Azure IoT Hubs without ‘azure-devices.net’(see 1.)
>
> `sDeviceId`: Device ID (see 1.)
>
> `wsDeviceSaS`: SaS token of the device (MQTT, HTTP) (see 2.)

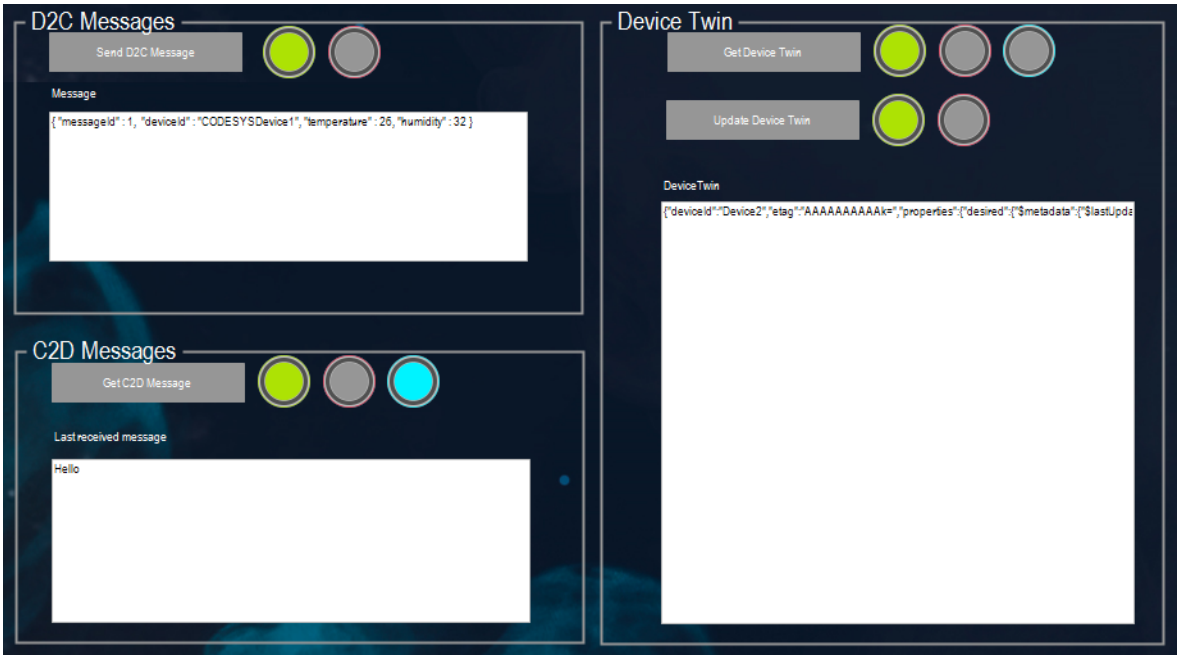
`wsIoTHubOwnerSaS`: SaS token of the IoT Hub owner (HTTP) (see 2.)

4. Downloading the project to the controller and starting it

Application AzureHTTPDemo

The following functions can be executed from the visualization:

- Send D2C message
- Get C2D message
- Get device twin
- Update device twin

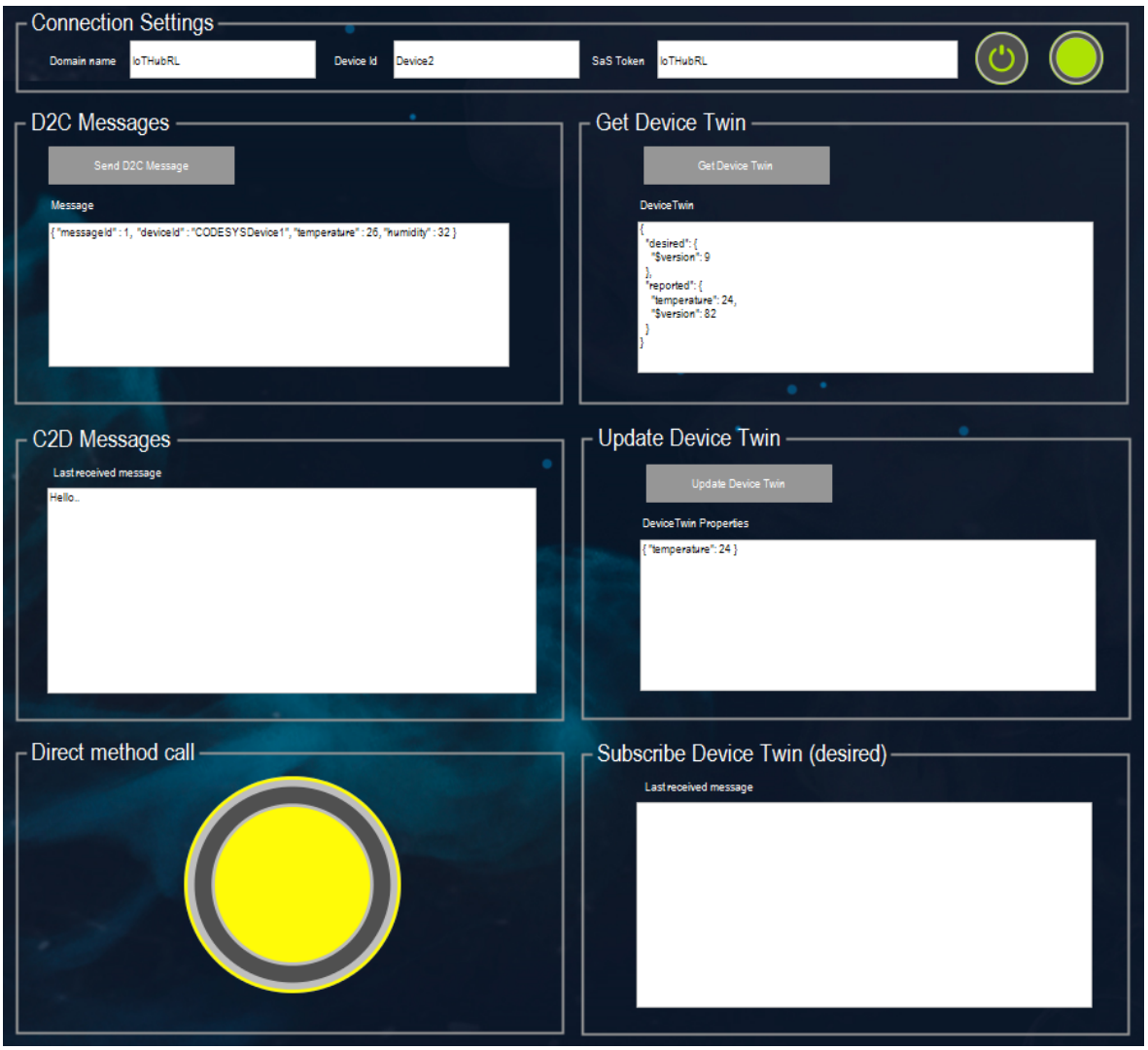


Visualization of the HTTPS sample project

Applikation AzureMQTTDemo

The following functions can be executed from the visualization:

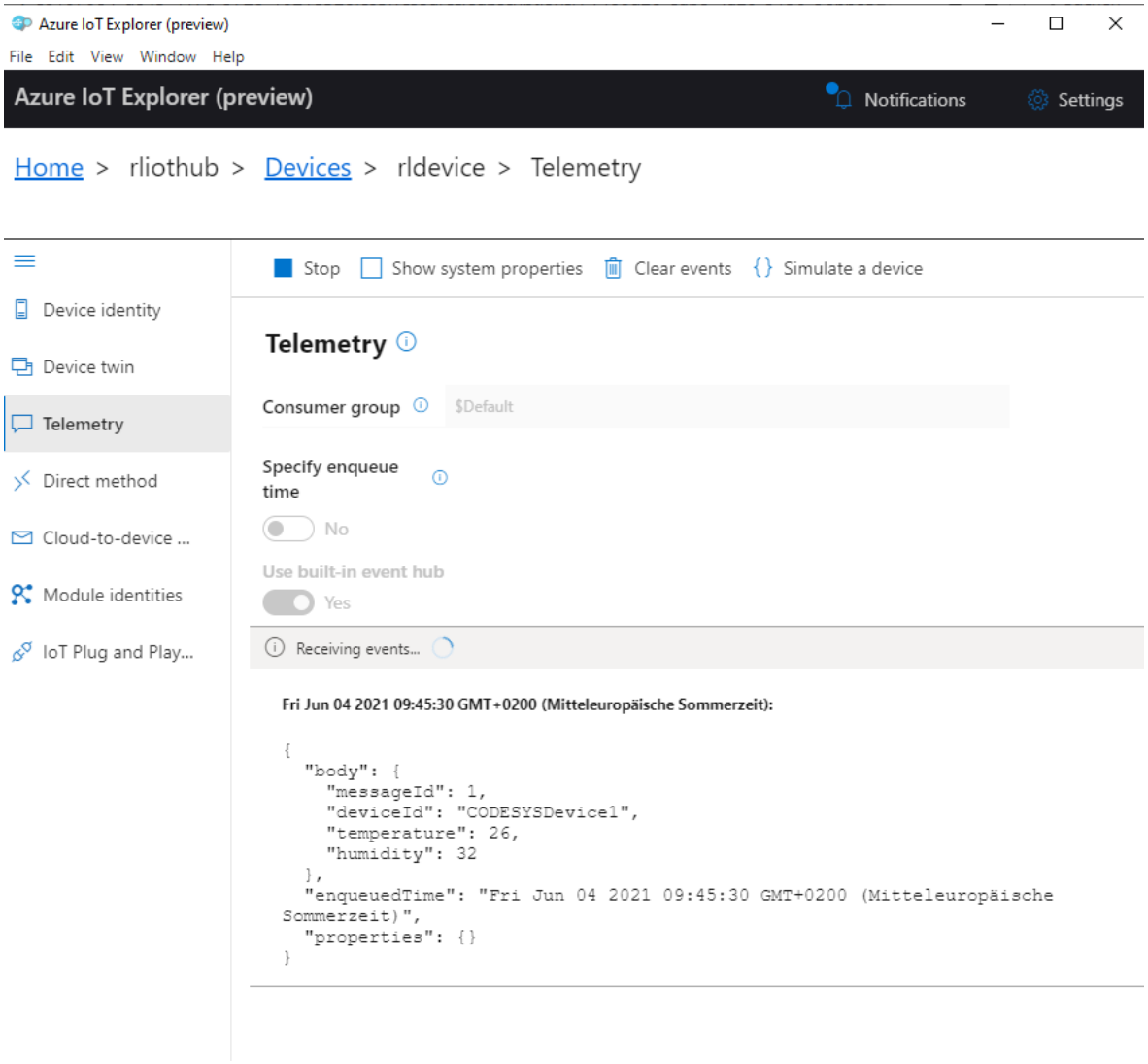
- Connect to IoT Hub via MQTT
- Send D2C message
- Get C2D message
- Get device twin
- Update device twin
- Direct method call
- Subscribe device twin (desired properties)



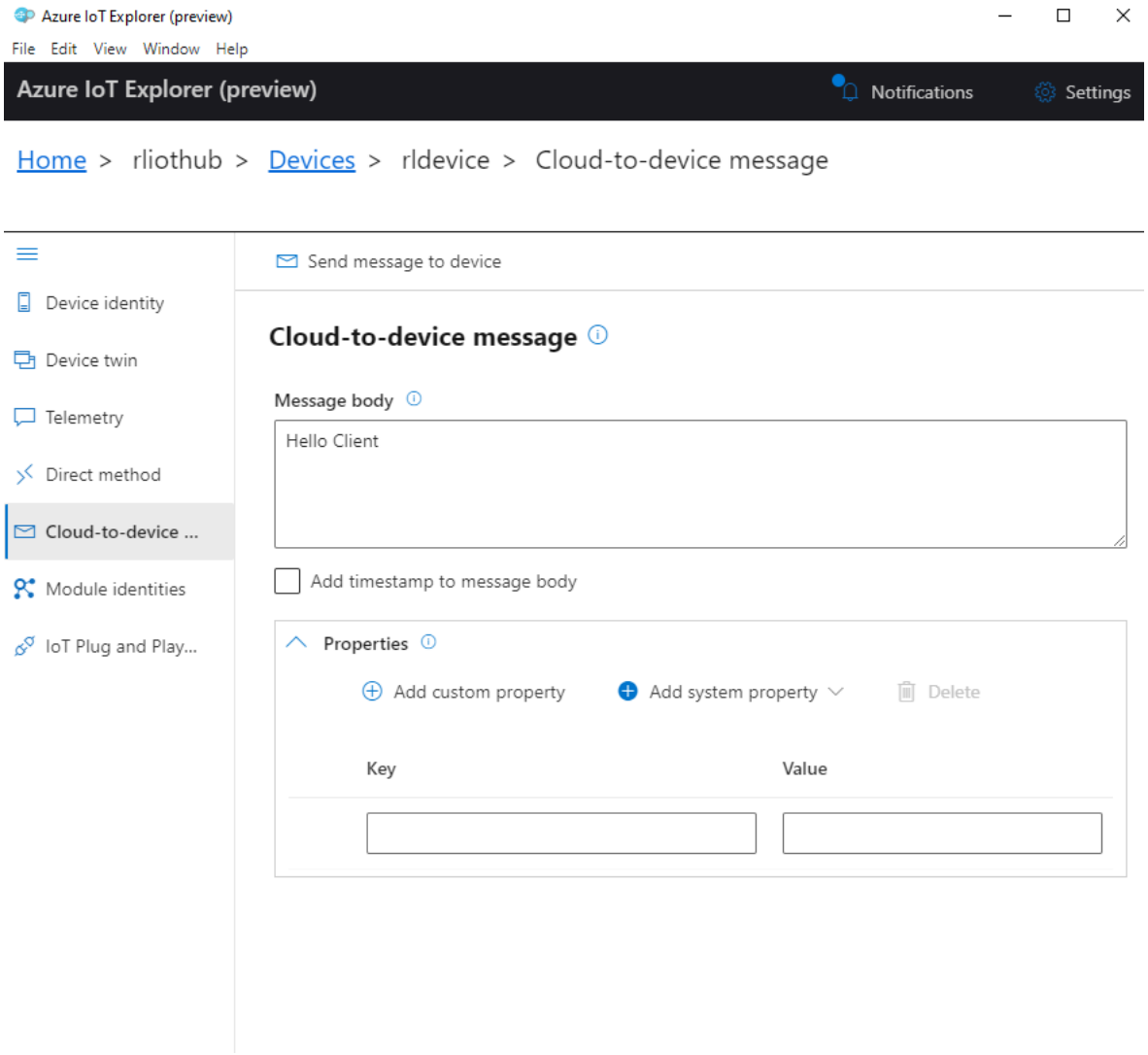
Visualization of the MQTT sample project

5. Sending and receiving messages with the tool ‘Azure IoT Explorer’

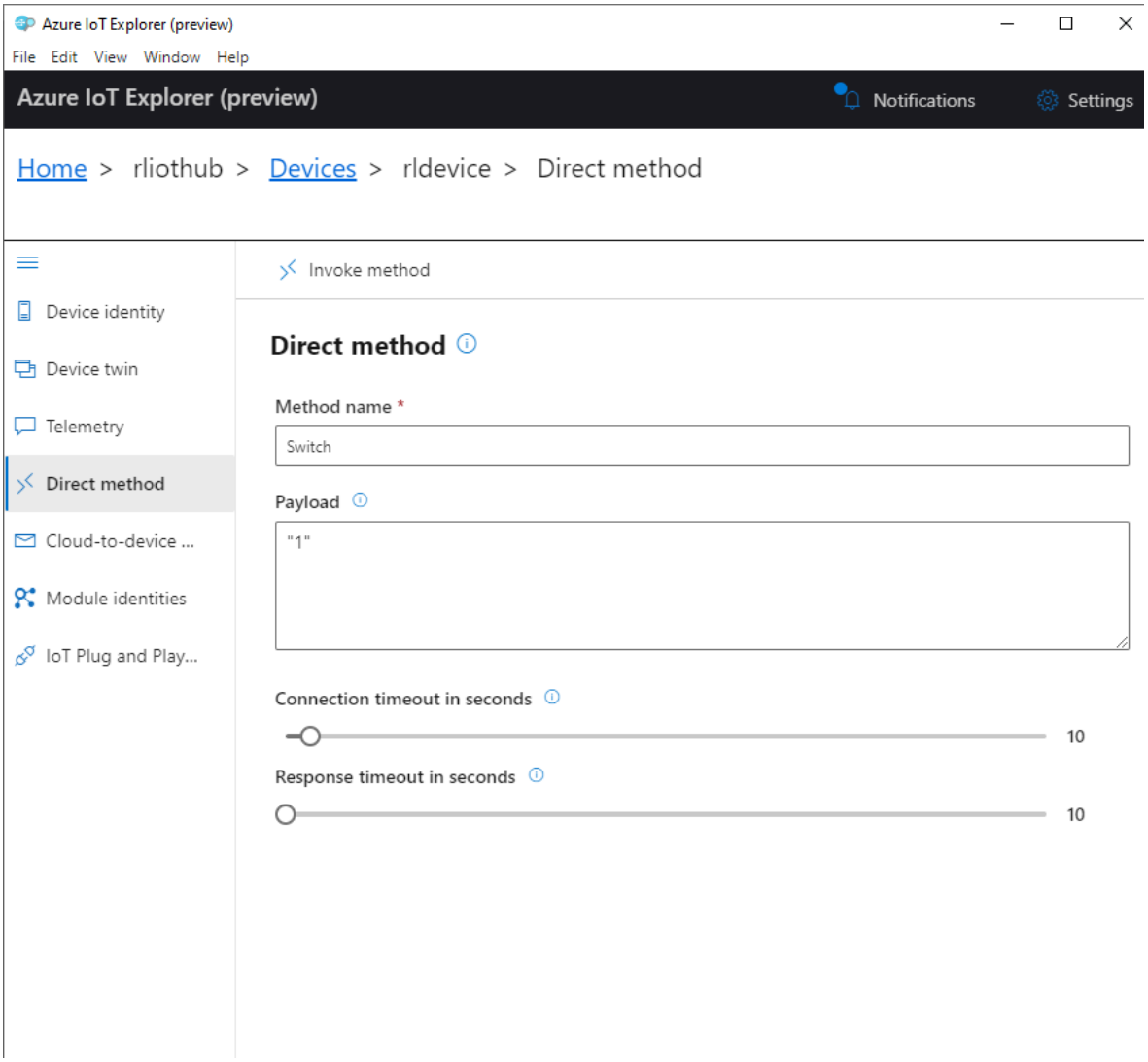
With the tool ‘Azure IoT Explorer’ (download see 2.) messages can be displayed and sent.



Azure IoT Explorer: Monitoring of D2C messages



Azure IoT Explorer: Sending C2D messages



Azure IoT Explorer: Remote method call

Options

In the Azure environment, messages are usually sent in JSON format. The CODESYS library “JSON Utilities SL” is ideal for parsing and generating JSON data.

General information

Supplier:

CODESYS GmbH
Memminger Strasse 151
87439 Kempten
Germany

Support:

Technical support is not included with this product. To receive technical support, please purchase a CODESYS Support Ticket.

https://support.codesys.com

Item:

Azure IoT Hub Client SL

Item number:

Sales/Source of supply:

CODESYS Store
https://store.codesys.com

Included in delivery:

CODESYS package

System requirements and restrictions

Programming system	CODESYS Development System V3.5.15.0 or later
Runtime system	CODESYS Control V3.5.15.0 or later
Supported platforms and devices	Note: Use the “Device Reader” project for locating the functions supported by the PLC. The “Device Reader” project is available in the CODESYS Store free of charge.
Additional requirements	Microsoft Azure account with Azure IoT Hub service; Device Explorer
Restrictions	•
Licensing	License activation optional on CODESYS Key or Soft Key (free of charge component of CODESYS Controls). Licensing via Soft Key is strictly linked to hardware. Note: Without a license the software runs for 30 minutes in demo mode.
Required accessories	-

Note: Technical specifications are subject to change. Errors and omissions excepted. The content of the current online version of this document applies.

Creation date: 2023-08-21