



MQTT Client SL

The “MQTT Client SL” library allows for linking a CODESYS controller to an MQTT broker. Then messages can be sent and subscribed to based on topics.

Product description

MQTT (Message Queuing Telemetry Transport) is an open-source IoT protocol that allows for the transmission of telemetry data as messages between devices. Device communication always takes place by means of an MQTT broker (e.g. Mosquitto <https://mosquitto.org/>). Messages are sent and subscribed to based on topics. A topic corresponds to a path (e.g. device1/temperature). Subscribing to messages is done by specifying a topic filter. Wildcards are also permitted (+ for one level and # for multiple levels). The message format is not fixed, which means that a JSON string or any data structure can be transmitted.

With the “MQTT Client SL” library, messages can be sent from a CODESYS controller to an MQTT broker, and messages can be subscribed to based on topics.

The library “MQTT Client SL” contains the following function blocks:

- MQTTClient FB for establishing an MQTT link
- MQTTPublish FB for sending messages
- MQTTSubscribe FB for subscribing to messages

The sample project “MQTT Client SL Example.project” shows how to use the library.

Supported functions

- Publishing and subscription of messages based on MQTT V3.1.1 and MQTT V5.0
- TLS encryption
- Client certificates (transfer of a certificate handle)
- Quality of Service: 0, 1, and 2 (QoS0, QoS1, QoS2) for the last will, publisher, and subscriber
- Data type “Topics”: WSTRING
- Maximum size of a topic: 1024
- The maximum package size and payload size can be configured by means of a parameter list.
- Multitasking and multicore support (MQTTClient, MQTTPublish, and MQTTSubscribe can each be run on different tasks or CPU cores.)
- Last will messages (QoS0, QoS1, QoS2)
- Wildcards (# and +)
- MQTT over WebSocket

Supported MQTT V5 functions

- Session expiry
- Message expiry
- Reason code on all ACKs
- Server disconnect
- Payload format and content type
- Request / Response
- Shared Subscriptions
- Subscription ID
- Topic Alias
- Flow control
- User properties
- Maximum Packet Size
- Optional Server feature availability
- Enhanced authentication
- Subscription options
- Will delay
- Server Keep Alive
- Assigned ClientID
- Server reference

Message Throughput

The maximum message throughput (number of messages/second, mps) depends on the hardware used, the size of the messages, the QoS settings and the configuration (parameter list MQTTParam, cycle time).

Example measurements

Configuration:

- Local Mosquitto Broker
- Local CODESYS Control Win (1 Publisher)
- Local CODESYS Control Win (1 Subscriber)
- MQTTParam standard settings
- Message size 1024 Byte
- Cycle time 1 ms

Results:

QoS0 => approx. 190 mps

QoS1 => approx. 130 mps

QoS2 => approx. 90 mps

Setting up a Mosquitto MQTT broker on a Raspberry Pi

Command for installing the Mosquitto broker:

```
sudo apt-get install mosquitto mosquitto-clients
```

Command for starting and stopping the service:

```
sudo service mosquitto start
```

```
sudo service mosquitto stop
```

Commands for testing:

```
mosquitto_sub -d -V mqttv311 -t hello/world
```

```
mosquitto_pub -d -V mqttv311 -t hello/world -m "Hello!"
```

Sample project: “MQTT Client SL Example.project”

The sample project “MQTT Client SL Example.project” (*Figure 1*) demonstrates how to use the function blocks. It can also be used for testing purposes. All inputs of the function blocks can be configured from the visualization. The example contains two subscribers and two publishers.



Figure 1: Sample application “MQTT Client SL Example.project”

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:

MQTT 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	MQTT broker (e.g. Mosquitto https://mosquitto.org/)
Restrictions	-
Licensing	License activation optional on CODESYS Key or Soft Key (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.

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