



MQTT Module Manual

Version 3.0.0

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GENERAL INFORMATION

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Please read the manual before beginning and keep the manual for later use.

The manual has been conceived and written for users who are experienced in the use of PCs and automation technology.

CONVENTIONS

[KEYS]	Keys that are to be pressed by the user are given in square brackets, e.g. [CTRL] or [DEL]
COURIER	On-screen messages are given in the Courier font, e.g. C:\>
COURIER BOLD	Keyboard input to be made by the user are given in Courier bold, e.g. C:\> DIR
"..."	Names of buttons to be pressed, menus or other onscreen elements and product names are given within double quotes. (e.g. "Configuration").
PICTOGRAMS	In this manual, the following symbols are used to indicate particular text blocks.
	<i>Caution!</i> A dangerous situation may arise that may cause damage to material.
	<i>Hint</i> Hints and additional notes
	<i>New</i> New features

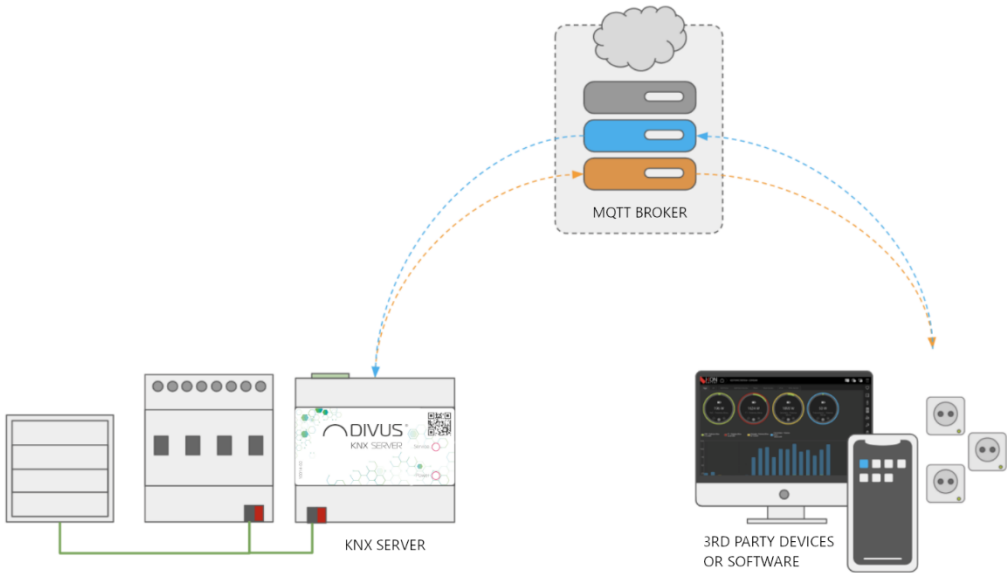
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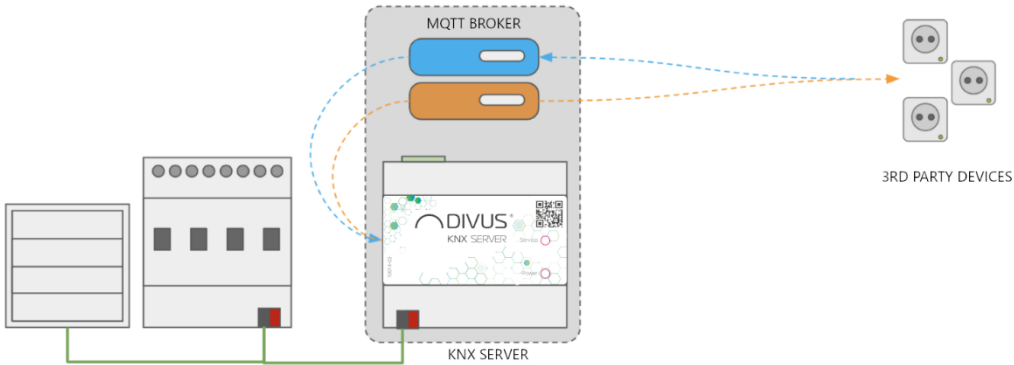
1 Overview

1.1 FOREWORD

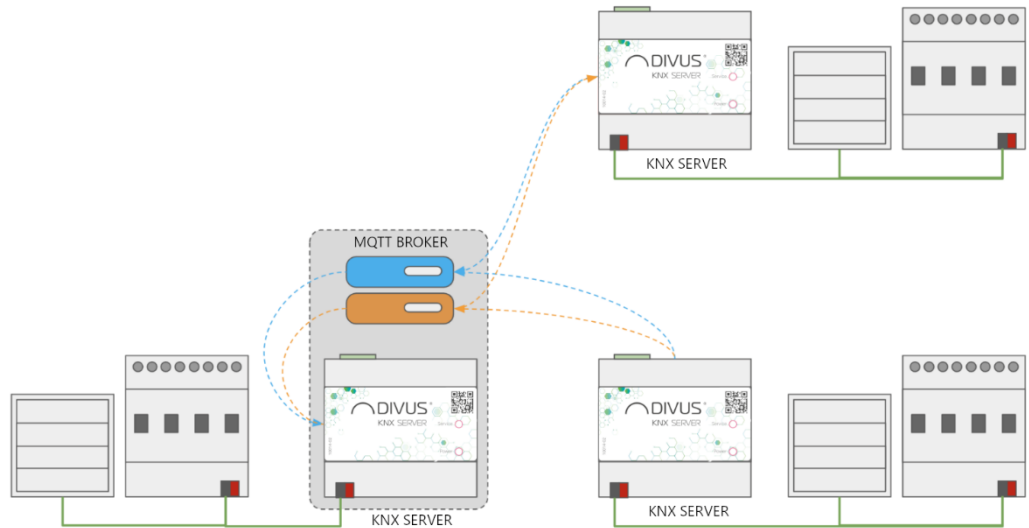
DIVUS KNX SERVER can connect as a client to one or more MQTT brokers to publish them and receive data in real time. This function is useful for interacting with devices or systems running on cloud services other than those of DIVUS.



In addition, the KNX SERVER can in turn work as an MQTT broker and thus fulfils the role of a "star centre" for communication with the devices of the local network with this exchange protocol:



This prerogative can also be used to allow two or more KNX SERVERs to communicate with each other as shown in the following diagram:



1.2 PURPOSE OF THIS DOCUMENT

This manual contains all necessary information to activate and configure the MQTT broker integrated in KNX SERVER; chapter 3 is dedicated to this topic.

Chapter 4, on the other hand, illustrates how to configure and use KNX SERVER as a client for an MQTT broker and how objects can be linked in such a way that when their state changes, they are published (to inform the MQTT service of the state change) and vice versa, they are commanded by the broker when receiving a data packet.

In particular, it is shown how to point the client to its own integrated broker or to the broker of another KNX SERVER in the network.

The manual is primarily aimed at installers, but can also be a good guide for end users interested in personalising the management of their own smart home system.

It assumes a good knowledge of the MQTT protocol and the devices to be managed and controlled by it, as well as of OPTIMA; many sections of this document refer to general concepts that can be deepened in the following manual:

[KNX SERVER - Administration Manual](#)

1.3 PREREQUISITES

To integrate a KNX SERVER with one or more MQTT brokers, you must have the following

- A KNX SERVER 3 that has been updated to version 3.0.0 or higher.

To use the integrated MQTT broker on the device, you need:

- A KNX SERVER 3 that has been updated to version 3.0.0 or higher



Older server versions and other devices of the OPTIMA family do not support the MQTT module!

2 MQTT Broker

2.1 FOREWORD

The KNX SERVER 3 offers an MQTT broker, which can be used to connect not only the web server itself, but also third-party devices that support this protocol or other KNX SERVERs, provided they are located in the same LAN.

This chapter explains how to set up the integrated MQTT broker of the KNX SERVER; after the described procedures have been performed, it is typically necessary to activate the MQTT broker:

- Configure third-party devices to operate the broker.
- Configure the KNX SERVER itself to allow its objects to interact with the broker (internal client connection).
- Configure other KNX SERVERs to point to the Broker.

For the first point, you need to refer to the documentation of the devices you want to integrate with the Broker.

The second and third point are described in the next chapter in reverse order; if you do not use the integrated Broker of the KNX SERVER, but only want to configure a connection to an external Broker, please jump directly to the next chapter.

2.2 BROKER SETTINGS

Select the item

TECHNOLOGIES > MQTT-BROKER > BROKER SETTINGS

to set the following:

EXECUTE AT STARTUP

Activate this option to start the broker when the system is booted up.

AUTHENTICATION

Activate this option to check the credentials of the connecting clients. A highly recommended option.

To start the broker, press the START button; after each further change, you must press UPDATE so that it is correctly applied.

2.3 USERS

If authentication is enabled, a user must be set up for each client device that is to connect to the Broker.

You must also prepare login information for the KNX SERVER itself when it connects to your Broker, as described in more detail in the following chapter.

Pressing the ADD button inserts a new line in the User section; specify for each new line:

NAME	Description of the user within the system
USERNAME	User name to be used by the MQTT client
PASSWORD	Password to be used by the MQTT client
ENABLE	Deselect to keep the user's credentials in memory but not allow him to connect

Press *Refresh* after each change in the user list.

Once the users are set up and the Broker has been started, follow the instructions in the next chapter to configure the client connection.

3 MQTT Client

3.1 FOREWORD

KNX SERVER allows the connection to more than one MQTT broker at the same time; it is advisable to keep the number of such connections as low as possible in order not to overload the system resources.

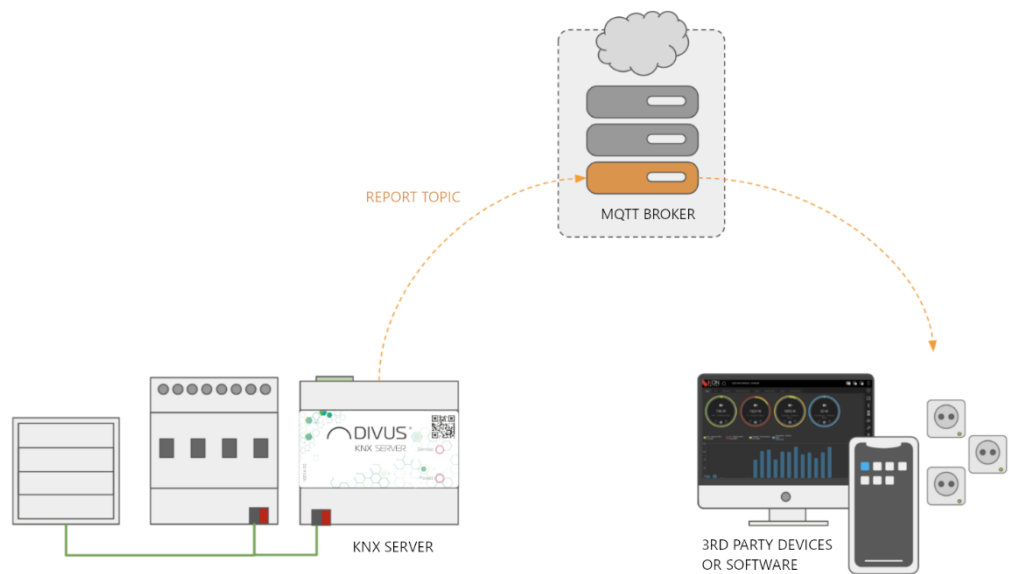
One or more objects can be assigned to each MQTT connection:

- when a value is received via MQTT, it is passed as a command to the object
- Conversely, if the state of the object changes, its value is sent to the broker via MQTT.

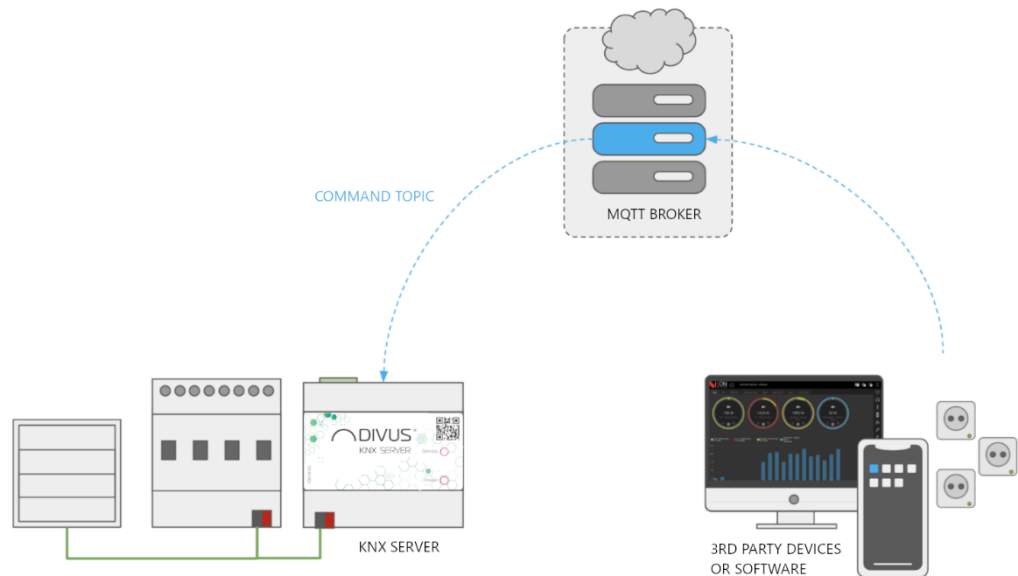
Two topics can be assigned to each of the objects connected to the link, i.e. the communication channels through which the KNX SERVER exchanges information with the broker; more information about MQTT topics can be found in the specifications of this protocol and in the documentation widely available on the Internet.

The report topic is used by KNX SERVER to send the status of objects when it changes

:



Conversely, when the KNX SERVER receives a value in the command topic, it executes it as a command for objects:



In both cases, KNX SERVER expects numeric values to be exchanged via Topics, using the dot as decimal separator (if they are not integer values); other formats, such as JSON, are not expected.

At least one command or report topic must be specified for each object. It is of course possible to specify both.

The use of the same topic for command and report is strongly discouraged, as this can create loops!

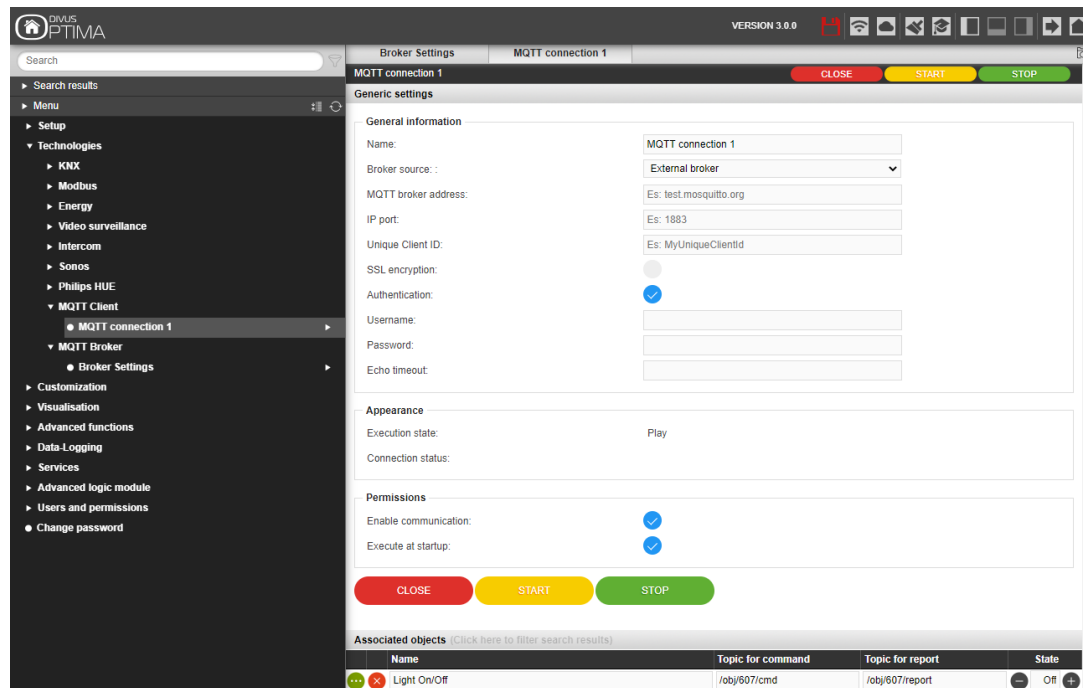
A KNX SERVER can take over the role of the MQTT broker, as described in the previous chapter. In order to connect to the integrated broker, a connection must be established in any case, but according to a simplified procedure, which is described in more detail below.

3.2 NEW CONNECTION

To create a new connection, expand

TECHNOLOGIES > MQTT-CLIENT

in the Administration side menu and press the (+) button in the toolbar. Once the new connection is created, access its tab to set the parameters. A window like the one in the following figure is displayed:



Enter the following information:

NAME	Identifies the connection within the project
BROKER SOURCE	Specify "Use external broker" to connect to a service on the Internet or to another device on the LAN. Otherwise, select "Use integrated broker " to connect to the internal broker of the KNX SERVER (see next section for details).
MQTT BROKER ADDRESS	MQTT broker Internet domain, without port and path
IP PORT	Communication port. As a rule, the following ports are used: <ul style="list-style-type: none"> • 1883: Unencrypted MQTT communication • 8883: MQTT communication encrypted with SSL
UNIQUE CLIENT ID	Enter a wording (no spaces or special characters recommended) that uniquely identifies the KNX SERVER Client for the broker. Depending on the MQTT service used, there may be restrictions on this wording or it may be provided directly by the service.
SSL ENCRYPTION	Enable if communication is SSL protected

	Enable if the service requires authentication
--	---

AUTHENTICATION

USERNAME	Access data of the service
PASSWORD	

ECHO TIMEOUT	Time interval in seconds for the anti-echo function. The default value is set to 10 seconds. Normally it is not necessary to adjust this parameter.
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When all the data has been entered, press **START** to start communicating with the broker; if the data and credentials are correct, after a few seconds the **CONNECTION STATUS** should change to **CONNECTED**. Now you are ready to link objects to the connection.

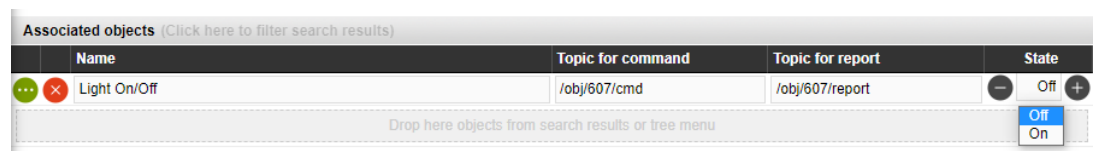
3.3 ASSOCIATION OF OBJECTS

Drag and drop the objects you want to connect to the service into the Assigned Objects section; for each of these objects, at least one of the following parameters must be specified:

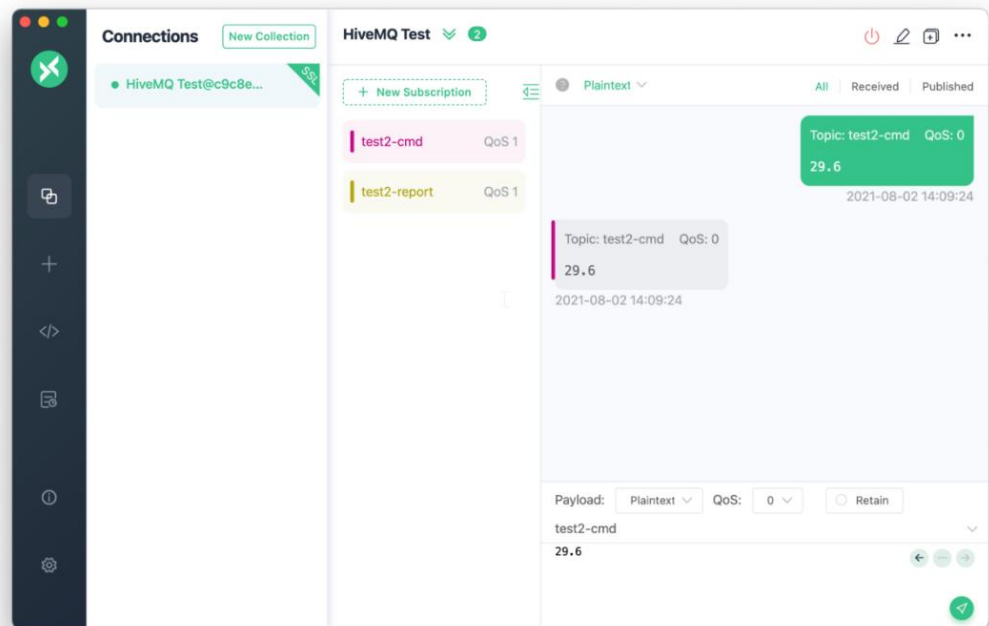
COMMAND TOPIC	Name or path of the topic to which commands are to be received.
----------------------	---

REPORT TOPIC	Name or path of the topic in which status changes are to be published.
---------------------	--

Via the selector in the **STATE** column, it is possible to control the object directly to check in real time whether the MQTT communication is correct:



The following screenshot shows an example of a test MQTT client software with which it is possible to subscribe to the same broker and read/write the same Topics and thus check the correct communication of the KNX SERVER:



- i** Before performing a test with the KNX SERVER, you should check the correct configuration and functionality of the broker. For this purpose, other known devices can be used or two instances of a test MQTT client software can be used, which write and receive each other on command and report topics.

When the expected operation is verified, one can proceed with the configuration of the KNX SERVER and perform the corresponding tests in the real environment.

3.4 INTERNAL CONNECTION

To connect to the internal KNX SERVER broker, select "*Use integrated broker*" in the above configuration of the client connection; in this case, it is not necessary to enter all the fields normally required and it is possible to select the user from a drop-down menu (instead of entering it manually). For security reasons, it is still necessary to enter the password.

3.5 M2M CONNECTION

It is possible to use the MQTT protocol to realise a bidirectional machine-to-machine communication between several KNX Servers as long as they are all connected to the same network.

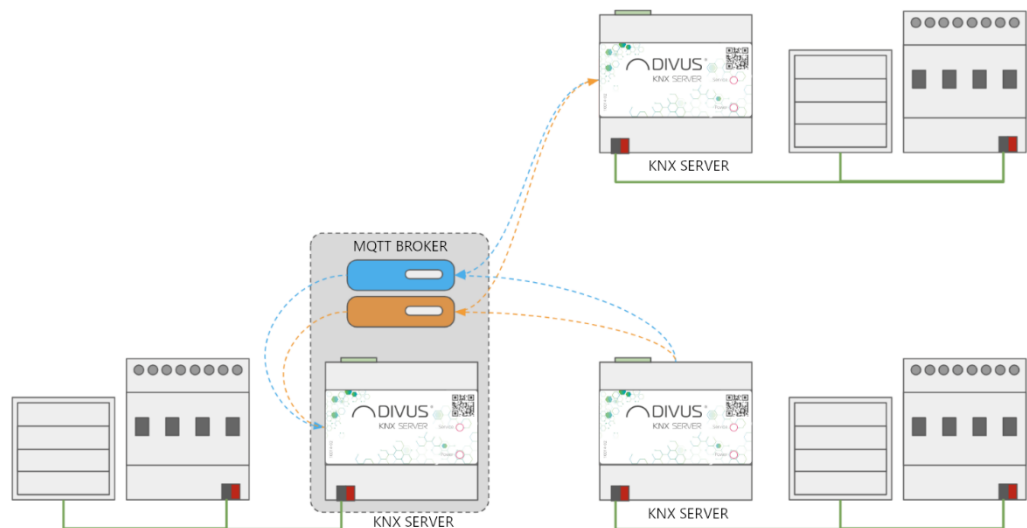
It must first be determined which KNX SERVER is to act as the "master" and the integrated MQTT broker must be activated on it.

Then the MQTT client connections must be configured as follows:

- On the same KNX SERVER, configure an "integrated broker" connection by selecting one of the previously set up users.
- On the other KNX Servers, establish a generic connection, specify the IP address of the master and manually enter the user to be used



For each KNX SERVER, including the master, a separate user must be set up and a unique client ID assigned.



- To control an object of another server from a KNX SERVER, proceed as follows:
- In the KNX SERVER to be controlled, drag the object (e.g. KNX) into the Assigned Objects area, arbitrarily deciding the topic for Command and for Report.
 - In other KNX Servers, create a virtual object with the same graphical representation and drag it into the corresponding MQTT client connection by...
 - using as command topic the one that is responsible for the report in the other server

In other words, the topics must be *crossed* between the object to be commanded and the *synchronised* object on the other KNX-SERVER, as shown in the figure.

